# Supreme Court of the United States,

OCTOBER TERM, 1927.

CORONA CORD TIRE COMPANY,
Petitioner,

vs.

DOVAN CHEMICAL CORPORATION,
Respondent.

No. 182.

## BRIEF FOR RESPONDENT.

## THE FACTS.

### ADDITIONS AND CORRECTIONS TO PETITIONER'S DISCUSSION OF ACCELERATORS AND THE VULCANIZATION ART.

That portion of the petitioner's brief which deals with the general subject of the vulcanization of rubber and the use of accelerators may be accepted so far as it goes, yet, because of its incompleteness the impression it has contrived to create is entirely misleading. What the respondent desires to add is absolutely essential to a proper understanding of the issues of this case, particularly the nature of the Weiss patent, the degree of invention it involved, and the question of its anticipation.

Vulcanization is the chemical union of raw rubber with sulphur to produce the substance that is the base of practically all commercial rubber products. The primary object of vulcanization is to fix the qualities characteristic of rubber so that the vulcanized product will withstand the wear and tear

of practical use and so that it will not be affected by ordinary variations in temperature. Raw, unvulcanized rubber is unable to stand flexing, abrasion, etc. and tends to become brittle with reductions in temperature and fluid with increases.

In theory, an accelerator is a substance which merely increases the rapidity with which this chemical union between the sulphur and raw rubber takes place. Such acceleration is desirable to save time in the process of vulcanization which is lengthy at best, and to save heat, which is utilized to promote the process even when accelerators are also used; but it is desirable chiefly, to avoid subjecting the rubber to prolonged or intense heating, for heat has a deteriorating effect upon rubber (R., p. 96).

The petitioner's brief truly states that the shorter the period of cure, the better the physical qualities of the resultant product, *other things remaining equal.* (Italics our own). Petitioner then draws the conclusion that, *within some limits,* the speedier the accelerator, the better the product. (Italics again our own.) The discussion that follows develops at considerable length this relation between the speed of the accelerator and the physical qualities of the product; but the limitations on the relation are not similarly developed. As a result the impression is created that speed is the only quality sought in a *commercially usable* accelerator. This is utterly untrue, for *in practice the other things petitioner mentions never are equal.*

Even if the accelerative substance could be introduced into the rubber mixture and had no effect upon it other than the mere promoting of the chemical union of the sulphur and raw rubber, and even if, upon the completion of the vulcanization process the accelerator could be removed from the rubber mixture, there still would be qualities requisite in a commercially usable accelerator other than mere speed.

In almost all kinds of rubber manufacture, the rubber mixture has to be handled for a very considerable length of time

after the introduction of the accelerator before the curing proper begins. It has to be rolled out into sheets, or forced into molds, or spread over models, or any one of hundreds of other manufacturing operations have to be carried out. It is essential that during these manufacturing operations vulcanization shall not begin. Yet the rolling and molding and other manufacturing operations have to be conducted at a high temperature—sometimes as high as 200° F. This is so because these operations can be carried on only if the "mix" is plastic. Because of this, it is necessary that with a *commercially usable* accelerator vulcanization shall not begin until a temperature is reached above that at which the manufacturing operations have to be conducted (R., pp. 43-44). There is a wide variation with different accelerators in the temperature at which vulcanization begins. With many, otherwise desirable accelerators, vulcanization begins at so low a temperature as to make impossible the necessary manufacturing operations; and such substances, though accelerators *in the strict chemical sense* of the term, are obviously *not commercially* usable.

The study of accelerators has also shown that with some, as soon as the vulcanization process is complete, overcure begins at once to develop and the utmost care is therefore necessary to stop the curing process as soon as the optimum cure is attained. With others, only an excessive increase in temperature or an excessive prolongation of the curing process results in overcure (R., pp. 40-41). For factory use, accelerators of the latter class are obviously desirable; they are more nearly fool-proof.

There are, however, few accelerative substances which, when introduced into a rubber mixture, have only the effect, first described, of speeding the union of the sulphur and raw rubber. In most cases chemical reactions take place during the curing process between the accelerator and the rest of the rubber mixture which result in actual chemical union, to a greater or lesser degree, between the accelerator

and the rest of the "mix." As a result, the physical characteristics of the resultant product may be, and often are, altered. The physical characteristics of the product may also be affected by the mere continuing presence of the accelerator as a physical constituent of the product, the accelerator imparting to the product some of its own physical characteristics (R., pp. 37, 398-399, 413).

Diphenylguanidine, the preferred di-substituted guanidine of the patent in suit is, as the respondent claims, one of those that improves the physical properties of the cured product over and above the improvement resulting from mere acceleration in the strict sense first above described (R., pp. 398-399, 413).

The physical characteristics that may thus be affected include elasticity and tensile strength. These are obviously qualities of the highest importance in determining the commercial utility of the product. Some accelerators discolor the product—a bad fault, for example, where the product is intended for the soles of white shoes or for similar purposes. Uncombined accelerator remaining in the product will, in the case of some accelerators, cause stains on substances coming in contact with the product. Other accelerators impart undesirable odors to the product and still others are so toxic as to endanger the health of the workmen obliged to handle them.

Effects, such as those above described, can, of course, be determined at the moment when curing is complete. Indeed, the cure is ordinarily said to be complete, or optimum, when the desired group of qualities exist in the product in the highest degree attainable with the particular mixture. *To know anything about the practical utility of the product*, a rubber chemist has to *measure* these qualities *exactly* with laboratory machinery devised for just such purposes. Comparatively small differences in tensile strength, for example, may add a thousand miles to the life of an automobile tire. *To know how to produce the useful product*, the time and temperature (or what is the

same thing—the steam pressure, for steam pressure is a measure of the temperature in the steam-tight vulcanizers) necessary to produce the optimum cure must be *accurately* determined.

In addition to these effects from the use of accelerators over and above their effect in speeding up the union of the sulphur and rubber—effects which can be determined at the moment curing is complete, there are some that can not be so determined. Because the accelerator remains a component part of the product, either in chemical or physical union with the other components thereof, incidental effects from the use of the accelerator may arise subsequently to the completion of the cure: a product, good at the moment of cure, may deteriorate very rapidly (R., p. 38). It is clear that any test made at the moment of cure can give no information on the lasting qualities of the rubber product. It must be allowed to age, either naturally or artificially. In the laboratory, of course, the aging is usually brought about by artificial means.

As already stated the *accurate* determination of the time and temperature and the quantity of a given accelerator necessary for an optimum cure is a laborious and intricate matter for the reason that the group of qualities marking optimum cure must be accurately measured. Accurate determinations are necessary where the practical utility of the product or the mode of producing it is to be determined; but sometimes, when *accurate* determinations are not an object, rubber chemists use the so-called "thumb-and-tooth" method of determining the completion of cure. This consists merely in pinching and pulling the cured rubber with the fingers and in biting it between the teeth.

It must be obvious that such a test, applied to the cured rubber, cannot possibly tell anything accurate as to its useful qualities (Kratz admissions, R., pp. 398-399, 414). Nor can it tell anything of the differences in that respect resultant from the use of different accelerators. These differences, important as they are, are not great enough to be

perceptible by so crude a method. Neither can that method tell anything as to the temperature at which curing starts with the accelerator used and, therefore, anything as to the possibilities of manipulation of the rubber "mix" subsequent to the introduction of the accelerator; or anything as to the protection the particular accelerator will give against overcure; or anything as to the lasting qualities of the product produced by the use of that accelerator. And obviously no accurate determination even of the relative speeds of accelerators can be bottomed on determinations by the "thumb-and-tooth" method of the attainment of cure.

The Court should also note that where the attainment of cure is determined by the observation of the physical properties of the product, whether these are determined scientifically or only by the "thumb-and-tooth" method, no accurate measurement of the speed of the "accelerator" in the strict sense first above noted on page 2 can possibly be made (footnote to Kratz paper, R., p. 838; also p. 414); for the physical properties observed may be the result of the "accelerator's" ability to improve the product over and above the improvement resulting from its capacity to speed the union of the rubber and sulphur. It is apparent that there is an ambiguity in the word "accelerator" (R., pp. 37, 398-399): accelerator, as used in the patent in suit, means a substance *that improves the rubber product* in addition to speeding up the chemical union of the rubber and sulphur. This is abundantly clear even from a casual reading of the patent.

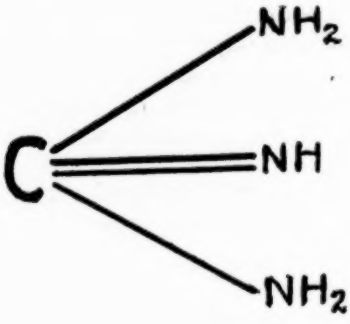
The petitioner seeks to trade on the primary dictionary meaning of the word "accelerate"; but the practical utility of a particular accelerator does not by any means follow from the sole fact that it is very active in speeding up the union between the sulphur and rubber, even if this fact has been accurately determined (R., pp. 658-659). There are many far more rapid accelerators than DPG that were known years before it (R., pp. 417-418); but the United States census figures in evidence in this suit show that the commer-

cial demand is for DPG (R., p. 643). Diphenylguanidine, as petitioner concedes (Pet. br., p. 116), combines more desirable qualities than do other accelerators. It is capable of a wider general use than other accelerators (R., pp. 37 and 662-666) and for the most important uses, such as tire manufacture, it is much the most satisfactory accelerator now available (R., pp. 664-666). Hence, the bitterness with which the petitioner's patent has been disputed.

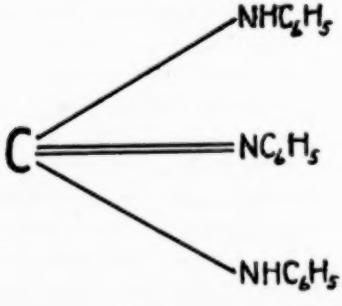
## THE STATE OF THE ART PRIOR TO THE WORK OF WEISS.

Up to about the year 1905, the trade had been using inorganic compounds as vulcanization accelerators (R., p. 37). At that time aniline oil, an organic compound, commenced to come into practical use. Subsequently other organic compounds came into general use, especially thiocarbanilide, commonly known as "thio", and hexamethylenetetramine, commonly known as "hexa". The last mentioned was probably the most common accelerator about the time of the incidents involved in this suit. It was objectionable because it poisoned the men who used it. Furthermore, it was not fast enough to protect the rubber from the effect of the heat in the curing. In two scientific papers submitted by rubber chemists in 1916 and 1917, the use of *certain members* of the guanidine family as accelerators was suggested. In this family there are hundreds, if not thousands, of varying compounds of which diphenylguanidine (DPG) is one and the di-substituted guanidines in general, a small group. Some companies had been experimenting with the tri-substituted guanidine, triphenylguanidine (hereafter abbreviated TPG), but aside from the experiments and tests referred to subsequently in this statement of facts no one had, prior to Weiss, employed or suggested the use of the di-substituted guanidines or diphenylguanidine (DPG) of his patent as accelerating agents in the vulcanization of rubber.

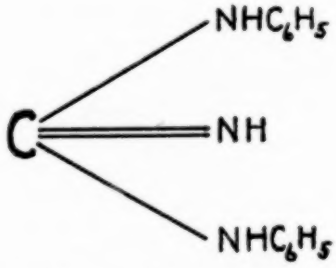
**Guanidine is represented chemically by the following symbol:**




Guanidine compounds are produced by substituting for hydrogen atoms various so-called radicles. When three hydrogen atoms in the unsubstituted guanidine molecule are replaced by radicles, the resulting compound is known as a tri-substituted guanidine. The replacement of three hydrogen atoms by the phenyl radicle $C_6H_5$, results in triphenylguanidine represented by the following symbol:




The replacement of two hydrogen atoms results in a disubstituted guanidine. Diphenylguanidine is an illustration of this, as indicated by its chemical symbol given below:




## THE CONCEPTION OF THE PATENT IN SUIT BY WEISS.

Late in 1917, Morris L. Weiss, a young struggling chemist who had received a degree from Cooper Union in New York City, entered the employ of the Republic Rubber Company at Youngstown, Ohio. That Company manufactured a variety of rubber articles, some made from pure rubber stock, some from "shoddy," which is reclaimed rubber. At that time, the Company was experimenting with TPG as an accelerator. Weiss was employed to conduct laboratory experiments. His early work was in the field of accelerators, and especially in the testing of TPG.

About March, 1918, he first conceived the idea of using, as an accelerator, the di-substituted guanidine, DPG*, and disclosed that conception to his superior Carlton (R., p. 89). At that time DPG was a laboratory product only. No practical method was known of producing it in quantity. It was necessary therefore before any accelerator experiments could be tried to find out how to make DPG. Weiss commenced eagerly on this research.

---

*Diphenylguanidine, which is the accelerator used by the petitioner and the only di-substituted guanidine accelerator used by him, is covered specifically by the Weiss patent claims 8 and 12. For this reason, this brief will be confined mainly to a discussion of diphenylguanidine and these claims. It will be necessary, however, also to refer to the Weiss patent claims 5 and 9, which cover diphenylguanidine generically, because the petitioner has presented false issues concerning them, as to scope and otherwise, in an attempt to induce this Court to make an unfavorable ruling concerning their validity. This will be considered later.

## THE EARLY WORK OF WEISS.

In May, 1918, in the Youngstown, Ohio, library, and in June, 1918, while on his vacation in New York, he obtained information from chemistry text books which enabled him to produce a small quantity of DPG (R., p. 103). He first added it to a rubber compound in December of 1918 (R., p. 104). These first tests were unsuccessful, as the slabs of rubber were overcured. The overcure, however, did indicate the speed of DPG and Weiss was encouraged to proceed with his experiments to determine whether DPG rubber, properly cured, would have useful qualities. The first compound used consisted of 50 parts by weight of rubber, 4 sulphur, 2 magnesium oxide, 1 DPG and 43 zinc oxide, and it was cured 50 minutes at 40 pounds steam pressure. "This was the regular standard rubber test recipe" (R., p. 105), and the regular time for cure. *As will appear later, Weiss made a practice of testing each new accelerator on this formula.* A second slab was cured 40 minutes at 40 pounds, but it likewise was overcured. A third slab cured 30 minutes at 40 pounds was also overcured. It was evident that DPG was very rapid; that the time required for vulcanization could be cut in two by its use. He showed the slabs produced by these experiments to Daniels, the chief chemist.

## THE FIRST REDUCTION TO PRACTICE.

These experiments used up the original batch which Weiss had been able to produce, but they seemed to him encouraging. He then prepared more DPG. Using the same compound, his first experiment with the second lot was cured 30 minutes at 30 pounds, and still resulted in an overcure. His second slab was cured 20 minutes at 30 pounds. A correctly cured product resulted—the trade expression is an "optimum cure". He then exposed another slab for 15 minutes at 30 pounds. A slight undercure resulted. *After carefully measuring the physical properties of the slab* he con-

cluded that a 20 minute, 30 pound cure was approximately right for the compound he had been using (R., pp. 105-109). *The physical tests showed unexpectedly superior tensile strength, elasticity, and other desirable commercial qualities.* Nothing theretofore known of DPG foreshadowed this result. None of these experiments were recorded until the 20 minute, 30 pound cure was reached. As this seemed to him to be the first successful experiment, he recorded it in his laboratory record book, known as the X-book (R., p. 748).

## THE DISPUTED EXPERIMENT.

This successful test appears in the X-book as experiment X-2034E (R., p. 748). There is a dispute as to the day on which it was made. The date noted on the "X" book page reads "2-10-19," indicating February 10, 1919, but the numeral indicating the month has the appearance of having been changed. Weiss was unable to recall having corrected the date but admitted that he might have changed what had been a "1" to a "2" as the result of having inadvertently dated, as one often will, an early February experiment as having taken place in January. The defendant contended that the figure had been changed from a "9" to a "2" and introduced a handwriting expert in support of that contention. If that contention were correct, the date of the experiment would be in September, subsequent to the reading of the so-called Kratz paper before the American Chemical Society, to which extended reference will shortly be made.

The trial judge, quite mistakenly, as respondent contends, accepted the testimony of the handwriting expert and therefore refused to credit Weiss with a successful experiment as early as February 10, 1919. The Circuit Court of Appeals for the Third Circuit reached the opposite conclusion, finding the date shown in the X-book to be the true date.

## THE UNDISPUTED REDUCTIONS TO PRACTICE.

However, on February 21, 1919, an experiment concerning which there is no dispute was made by Weiss and recorded in the X-book at page X-2006H (R., p. 731). This experiment was on a shoddy compound. As has been mentioned previously the Republic Rubber Company manufactured many of its products from shoddy. The ordinary shoddy averages about 40% pure rubber. As far as chemical reactions and, especially, the effect of vulcanization accelerators are concerned, experiments conducted on shoddy or on pure rubber are of the same practical and scientific significance. *Again Weiss carefully measured the physical properties of the cured slabs.* These physical tests of X-2006H show marked superiority, as will be shown fully in the argument, over slabs prepared from similar compounds but accelerated with TPG. The superiority of the product was just as significant as the rapidity of the accelerator.

On March 4, 1919, Weiss made a further successful test, likewise undisputed, which he recorded in the X-book page X2042A (R., p. 753). This experiment was also made on shoddy and was made for direct comparison with an actual factory recipe used at that time, which employed one part of litharge as an accelerator. *Again the physical tests of the slabs were made.* The physical tests indicated the superiority of DPG over litharge.

Weiss kept the slabs on his desk under observation after these experiments.

These tests exhausted the supply of DPG which Weiss had been able to produce by chemical processes. They clearly constitute successful reductions to practice on which he was entitled to base his claim to invention. The respondent contends that the invention may be dated at least as early as these three recorded experiments.

## THE CONTINUING ACTIVITY OF WEISS.

Thereafter, Weiss was obliged to devote his entire time to work in other lines laid out for him by his superiors. Indeed, his actual tests with DPG had been carried on entirely as a side line to his regular work, which at that time lay chiefly in the development of TPG as an accelerator and of processes for its cheap manufacture. *But he was convinced by the results of his practical tests and devoted himself to perfecting a means of producing DPG commercially.*

Some time during the summer of 1919, Nellen of the Republic Company, gave Weiss a factory recipe to enable Weiss to test out DPG on a factory compound, the particular stock being one used for making washers for oil wells. *On September 6, 1919,* Weiss tried this recipe using TPG as the accelerator, the test being recorded at X-2010H, left hand page (R., p. 736). For purposes of comparison, on September 29, 1919, Weiss used the same recipe, adding DPG for his accelerator. This experiment is recorded at X-2010H, right hand page (R., p. 736).

This incident shows continuing diligence by Weiss with DPG during the summer of 1919 *and prior to September 6,* for Weiss did not know of that recipe until it was given to him by Nellen. Nellen testified (R., p. 231) that at the time he gave the recipe to Weiss it was for the purpose of permitting Weiss to try out DPG in it.

During the summer of 1919, as stated, Weiss was engaged in perfecting a process of producing DPG, which ultimately ripened into a patent, but not the patent in suit. He had proceeded with sufficient success to enable his superior Daniels to have in his possession before September 2, 1919, several hundred grams of DPG. Obviously this was produced only because Weiss and Daniels were convinced that the February and March experiments had successfully demonstrated the qualities of DPG as an accelerator.

## THE READING OF THE KRATZ PAPER.

On September 2, 1919, Daniels went to Philadelphia to attend the meeting of the American Chemical Society. At that meeting on some day between September 2nd and September 6th, a paper was read by one G. D. Kratz, a rubber chemist, employed by the Falls Rubber Company. The paper related to vulcanization accelerators and was later published in the Journal of the Society in April, 1920.

It is largely on the information contained in this lecture that the petitioner has based its contention that Kratz and not Weiss was the first inventor of the subject-matter of the patent in suit. The later publication of the paper was no statutory bar, because within two years of the date of the filing of the application.

The part of the lecture around which the controversy centers is a table which Kratz placed on a blackboard and which was copied by some of the rubber chemists attending the meeting, including Daniels, who was Weiss' superior. This table which appears on page 131 of the book of exhibits purports to state the relative speeds of various suggested accelerators in comparison with aniline oil as a standard or base. As appears from this table, the parts required to equal one part of aniline were respectively .500 of TPG and .075 of DPG. It is apparent that the table suggested that TPG was twice as rapid as aniline and that DPG was about seven times as rapid as TPG. The lecturer went on to point out that he had used his accelerators in a compound consisting of 92.5 parts of rubber and 7.5 parts of sulphur vulcanized for 90 minutes at 148 degrees C.

The meeting at which the Kratz lecture was read was attended by the leading rubber chemists of the country, including representatives of Firestone, Fisk, DuPont, and other large manufacturers, all companies that were direct competitors of the company with which Kratz was associated. Kratz stated on the stand that he did not intend by his

lecture to disclose any valuable rubber information to his competitors and his success in this regard is borne out by the fact that none of those present carried away from the lecture anything which he used in his own plant thereafter. In his paper he pointed out that his researches had not been conducted with an eye to discoveries of any practical importance. To Daniels the table showing the speed of DPG compared with other accelerators seemed a confirmation in abstract form of the practical discoveries of his humble assistant. He was impressed by this confirmation, hearing it, as he did, at a meeting of the American Chemical Society and upon his return gave Weiss more freedom to proceed with the DPG work of whose importance Weiss himself had all along been convinced. Numerous successful experiments on various factory compounds are thereafter recorded in the X-book at pages 2010H, 2064D, 2059D, E, F, G, 2065C, D.

## THE KRATZ EXPERIMENTS AT NORWALK.

Prior to the delivery of his lecture in 1919, Dr. Kratz had done certain experimental work with accelerators which was introduced by the petitioner as evidence of prior knowledge and use. In 1916 he was an assistant chemist at the Norwalk Rubber Company. Under date of October 31, 1916, he entered in a factory laboratory record the results of some experiments on rubber compounds in which various accelerators were used, including DPG. Under date of November 1, 1916, his records show a table of the comparative speeds of various accelerators. The table shows that DPG is seven times as rapid as TPG (R., p. 953). This, it will be noted, is *exactly* the same ratio as that disclosed in the figures given in the lecture. *The actual speed of DPG relative to TPG is much higher than this.* No practical use was ever made of these results. They were kept quite secret. These experiments are submitted as anticipations. Respondent contends that they cannot be so held because they were inconclusive, secret, and abandoned.

## THE ALLEGED FURTHER WORK OF KRATZ.

About a year later, in September, 1917, while in the employ of the Falls Rubber Company, Kratz testified that he accelerated with DPG a batch of rubber compound from which 300 automobile inner tubes actually were made and shipped. This testimony stands alone and uncorroborated. Kratz testified that he disclosed to no one what substance he was putting into the compound (R., p. 393). The plaintiff contends that without corroboration this testimony cannot be accepted as evidence of anticipation; that if the incident occurred, it was entirely secret, and that it must be inferred that it was unsuccessful because it was never repeated or reported. Kratz testified that he experimented further with DPG and other accelerators at the Falls Company plant in 1918. Upon this work Table I of the Philadelphia paper was supposed to be based. This is the only portion of that paper pertinent to the present case. Of this alleged work, no record or corroboration was introduced. It will be shown that the Philadelphia paper contains internal evidence that these tests were never performed at the Falls Company plant in 1918 as testified.

## THE ALLEGED BALDWIN EXPERIMENT.

Reliance was also placed upon one other alleged anticipation, the so-called Baldwin experiment recorded in the X-book of the Republic Rubber Company on page X-2005. This experiment is dated February 22, 1917. Baldwin was a predecessor of Weiss at the Republic. According to an entry on the page, DPG was used as an accelerator in this experiment. Weiss testified that this entry did not appear in the X-book during the time that book was in his possession. He was corroborated by numerous witnesses. An examination of page X-2005 shows that the experiment bears no relation to the other tests recorded on that page. Furthermore it was marked "N. G." near the foot of the column. This page of the X-

book was curiously missing for several months prior to the trial in January, 1923, of the *National* case in the Southern District of New York. When found it was shown to have been in possession of counsel for the defendant in that case. It will be shown in the argument that the entry in the X-book contains internal evidence that the DPG entry is an interpolation.

Neither Judge Hough, in *National Aniline* v. *Dovan*, 292 Fed. 555, to which further reference will be made, nor either court herein refers to this alleged experiment. Judge Manton, who tried the *National Aniline* case, thought it a fabrication. (See Appendix, p. 104).

## THE ACTIVITIES OF WEISS AFTER LEAVING THE REPUBLIC COMPANY.

In March, 1920, Weiss left the employ of the Republic Rubber Company and made written application for employment with Firestone and with the National Aniline Company. On one of these applications he referred to the Kratz paper, which it is to be remembered had been read before the American Chemical Society, as substantiating the possibilities of DPG as an accelerator and bottomed his request for employment on the fact that he had discovered a process for making DPG cheaply. At the time it was this latter discovery that he believed to be the more valuable. He had been told by a friend that his accelerator discovery was not patentable. Through inexperience he accepted this view and sought no further advice until later.

His reference to the Kratz lecture, the petitioner seeks to construe as an admission that Kratz was the true inventor of the patent in suit, the argument being that had Weiss believed himself to be the inventor, he would have put forth this claim in an application for employment. The event has no such significance. Weiss, unknown and out of work, sought only to gain credence for his own discoveries through refer-

ence to the pronouncements before a learned society. There was no admission that Kratz had invented anything.

Neither Company employed Weiss, and shortly thereafter he appeared in New York, disclosed his inventions to Messrs. Doty and Woodward, who with Weiss thereafter formed the plaintiff corporation for the manufacture of vulcanization accelerators, especially DPG. Activity commenced at once. A factory was obtained in Brooklyn, which unfortunately burned in September, 1921. A new plant was obtained in Newark and was in operation by January, 1922.

## THE OBTAINING OF THE PATENT IN SUIT.

During his experimental work at the Republic Rubber Company, Weiss had been advised erroneously by his colleague Stevens that his discovery of the process of using DPG as an accelerator was not patentable (R., p. 168). Weiss was a young Russian with little experience in this country, and he accepted the opinion of Stevens without further inquiry. During 1920 and the early part of 1921, his major interest lay in the successful commercialization of his discovery of a cheap method of making DPG, for which he filed an application for a patent on July 2, 1921, disclosing in the application his discovery of the efficacy of DPG as an accelerator. On November 12, 1921, he filed the application for the patent in suit which issued March 28, 1922.

## THE PATENT IN SUIT.

In the patent in suit there are twelve claims. These may be conveniently divided into three groups: Group I—claims 1, 5, 9—relating generically to di-substituted guanidines of which DPG is a type or example. Group II—claims 2, 4, 6, 8, 10, 12—relating specifically to the di-substituted guanidine, DPG. Group III—claims 3, 7, 11—relating specifically to the di-substituted guanidine, DPG, derived from a certain source (thiocarbanilide). The claims cover both the process

of making "compounds of rubber" with the substances just mentioned and the product so obtained.

Group III may be left out of consideration entirely because there was no proof available, and therefore no proof, as to the source of the petitioner's DPG. Of Group II it will suffice to consider claims 8 and 12, the others being generally to the same subject matter. Of Group I it will suffice to consider claims 5 and 9, claim 1 being generally to the same subject matter.

The patent sought and obtained is no new variety, but of the same sort as any other covering advances in the chemical art. The attempt in the brief of the petitioner to make it appear that the Weiss patent is merely upon Weiss' observation that DPG, as an accelerator, has high speed is without justification. The respondent's patent cannot be said to be a "patent of observation" in any sense in which this cannot also be said of every patent for advances in chemical art. In a certain sense, every such patent is a patent upon the observation that when certain substances are brought together, certain chemical reactions ensue between them. In that sense, respondent's patent is a patent of observation; but in no other.

This attempt of the petitioner's to belittle Weiss' achievement goes back to the opinion of Judge Hough in the *National Aniline* case; but it is submitted that a patent cannot be invalidated by reducing it to a striking phrase.

The claims are based on the discovery that di-substituted guanidines, and particularly diphenylguanidine, have practical usefulness in the vulcanization art by reason of their being "particularly effective" and "more powerful and efficacious" as accelerators. The object of the invention is stated to be

> *"to improve rubber compounds so that the finished product shall be of superior quality* and so that the time required for vulcanization shall be greatly reduced over that ordinarily required for such purpose." (Italicization added.)

And the added power and the added efficacy claimed for DPG and other di-substituted guanidines are explained as follows:

> "For example, in the vulcanization of hard rubber articles the use of diphenylguanidine not only hastens the vulcanizing action but results in a final product much superior in texture, strength, durability and aging qualities over that when the triphenylguanidine is used. A greatly improved product also results when diphenylguanidine is used as an accelerator in the vulcanization of soft rubber compounds, particularly as regards elasticity, aging qualities and freedom from 'bloom.' In these and similar instances, it has been found that the use of triphenylguanidine requires from two to three times as long a period in vulcanizing as when diphenylguanidine is used, particularly at lower heat or steam pressure than those commonly employed."

* * * * * * * *

> "It will therefore be appreciated that when using the accelerator according to my invention the vulcanization is accomplished by using comparatively small quantities of the accelerator, thereby obviating undesirable loading or adulteration of the rubber compound. Furthermore, by the use of such accelerator, the texture and durability of the final product is greatly improved and the tendency commonly present in vulcanized rubber to bloom and become brittle with age is greatly reduced if not entirely obviated. My improved accelerator is particularly useful and valuable where it is desired to produce a harder or less elastic portion in an article leaving other parts which are required to be more elastic and flexible, such as in automobile tires where the beadstock is usually made harder than the body or carcass of the tire proper. The relative amounts of vulcanizing agent and accelerator may be so proportioned that the various parts of a single article may be cured to different degrees of hardness without danger of overcuring the softer or more elastic parts. I have found moreover that diphenylguanidine does not need zinc oxide to shorten the time of cure. I however prefer to use zinc oxide on account of its effects on the physical properties of the products."

The specification also contains the customary type formula and a delineation of the typical procedure.

The petitioner has seized on three lines from the patent—"I have found that diphenylguanidine is much more powerful and efficacious in vulcanization than triphenylguanidine"—and pretends that it states the whole of the patented idea, and that that idea is "that DPG is an accelerator of great activity, of an activity greater than TPG" (Petitioner's Brief, p. 15).

Even on the basis of the lines excerpted by the petitioner, his statement is manifestly false. The claim is not only that DPG *is more powerful, but that it is more efficacious.* Power clearly means speed, but efficacy means something more. The added passages from the patent which have been quoted above explain what is meant.

It must be apparent therefore, that the petitioner's presentation to this Court of the subject matter of this suit is not quite fair.

## THE PRESENT SUIT.

As the plaintiff built up a rapidly growing business during 1921, formidable competition appeared. Roessler & Hasslacher took a license in 1922 and up to the time of the decision of the Second Circuit Court of Appeals referred to hereafter, had paid over $90,000 in royalties to the plaintiff. The use of DPG in the industry became widespread. If the patent was valid, it was a most valuable discovery. Rubber manufacturers were eager to defeat the patent and avoid license fees. Dupont, National Aniline, and Atlantic Dyestuff, all powerful producers, chose to fight.

The charge of infringement in the present suit is based on an admitted use of DPG, covered specifically by the "diphenylguanidine" accelerator claims 8 and 12 and generically by the broader "di-substituted guanidine" accelerator claims 5 and 9.

The present case is an "ordinary" patent case involving only issues of fact as to invention, anticipation and infringement. The case could not be in this Court on certiorari but for the fact that the patent in suit, upheld by the Third Circuit, had been previously held invalid in a decision of the Second Circuit in *National Aniline Co.* v. *Dovan Chemical Corp.*, 292 Fed. 555.

The petitioner has sought to give the impression that the respondent's case rests on plainly perjured testimony. That this is not so is perhaps sufficiently indicated by the fact that of the eight judges who have thus far had the patent in suit before them, four have been in favor of and four against the validity of the patent.

The record in the present case, as will be shown in detail hereafter is much stronger in favor of the respondent by reason of the inclusion of additional evidence, than was the record in the *National Aniline* case. This fact alone might be thought sufficient to account for the conflict of the Circuit Courts of Appeal but the argument will show that the Second Circuit failed to grasp the true nature of the patent in suit.

## SUMMARY OF THE ARGUMENT.

### I.

Weiss is entitled to date his invention of the patent in suit as early as March, 1918, for its conception, and February-March, 1919, for its reduction to practice, under either of which dates he is the first, sole, true and original inventor. The position of the respondent is based on the well-settled principle that a patentee is entitled to date his invention as early as his first practical conception and disclosure thereof, provided thereafter he exercises reasonable diligence in reducing his invention to practice. The evidence in the present case is full and complete as to Weiss' practical conception of his patent in March, 1918, his continuing diligence thereafter and his final successful reduction to practice of February 10,

1919. This successful test was followed by two others on February 21st and March 4th. The testimony of respondent's various witnesses in this case and his documentary evidence dovetail in an unusual degree. Respondent's detailed consideration of the matter in the argument shows that there is not the shadow of a ground for petitioner's attack on the credibility of respondent's witnesses, and the evidence of these witnesses should be accepted in full, including that as to the disputed test of February 10, 1919. But even if there were ground for the attack upon that entry, respondent ought still to prevail, since the tests of February 21st and March 4th, 1919, are undisputed and constitute a clear reduction to practice within the meaning of the patent law. The attempt of the petitioner to explain away these successful reductions to practice is shown in the argument to be without foundation in the evidence and completely inconsonant with reason and common sense.

II.

None of the defenses based on instances prior to the Kratz paper of September 6, 1919, defeat the patent. These defenses are (a) admitted laboratory tests by Kratz at Norwalk in 1916; (b) a single alleged actual use of DPG by Kratz for the acceleration of a mix for three hundred tubes at the Falls Rubber Company in 1917; (c) alleged laboratory work at the Falls Company in 1918 by Kratz; (d) an alleged experiment by Weiss' predecessor at the Republic Rubber Company; and (e) certain references in papers published by King, Twiss and Du Bosc.

Kratz's early work at Norwalk is shown to be inconclusive, secret, inexact and abandoned. The alleged manufacture of three hundred tubes at the Falls Rubber Company in 1917 rests on the uncorroborated testimony of Kratz. It is shown to have been secret and is admitted to have been quite at variance with the usual factory routine. It was an isolated experi-

ment, unrepeated and abandoned. The occurrence is unexplained and unexplainable. The whole instance smacks of improbability and, standing as it does on the uncorroborated testimony of a rival, fails to meet the burden of indubitable proof of an anticipation placed upon one attacking a patent. The alleged subsequent experimental work of Kratz at the Falls Company in 1918 is quite as inexact and inconclusive as his work at Norwalk in 1916. It was in no sense a reduction to practice and the stated results of these experiments when compared with those admitted to have been performed at Norwalk in 1916 show that the experiments never could have taken place. The evidence for them, also, is merely the uncorroborated testimony of Kratz. The defense is clearly insufficient and insufficiently proved. The respondent in the argument shows that the alleged anticipation by Weiss' predecessor at the Republic Rubber Company is, as found by Judge Manton in the *National Aniline* case, a fabrication. The evidence on this point is internal to the alleged record of the experiment and is conclusive. Moreover, the experiment was admittedly isolated, and was marked "N. G." in the alleged record thereof. As to the papers of King, Twiss and Du Bosc, it is sufficient to say that they do not actually refer either to DPG or the di-substituted guanidines but to entirely different substances.

III.

The Kratz paper, the chief reliance of the petitioner, professes to be merely an embodiment of the results of the alleged experiments at the Falls Rubber Company in 1918. It is probably based largely on the Kratz experiments of 1916 at Norwalk. The disclosures in the lecture were inexact from a scientific point of view and inconclusive from a practical point of view. In both the Norwalk experiments and those at the Falls Company determinations of cure were made by the crude "thumb-and-tooth" method. Kratz himself admitted

the inaccurate and misleading character of his figures and professed to be uninterested in practical results. There is no evidence that the information in the paper was ever put to any practical use anywhere except the improbable story of Kratz as to the making of the tubes at the Falls Rubber Company in 1917. Not only does an examination of the technical contents of the paper show that it was insufficient to constitute an anticipation of the patent in suit, but the consensus of the expert testimony at the trial was to the same effect as is also the inference to be drawn from the behavior of those who heard, or heard of, the paper.

## IV.

The Weiss patent discloses patentable invention. Whatever plausibility the petitioner's argument on the point of invention may seem to possess rests on the similarity of the names, "diphenylguanidine" and "triphenylguanidine". These similarities in name mean nothing in terms of practical usefulness as is conclusively shown in argument that follows. The presumption of validity arising from the issue of a patent is unusually strong in the present case because of Weiss' frank statement in his application of the exact state of the art prior to his work. The disclosure in the Weiss patent is twofold—speedy curing of the compound, and improvement of the resultant product. If either shows patentable novelty, the patent must be sustained. Petitioner makes no attempt to attack the patentable novelty of the second of these disclosures. Instead he seeks to reduce the patent to the former only. The Weiss invention is shown to have required more than mere mechanical skill and shown to have constituted more than a substitution of materials. The petitioner's argument fails to take any account of the essential quality in any discovery which the patent law strives to protect, to wit, the utility thereof to the public. This utility is conclusive where any doubt exists as to patentable inven-

tion according to the accepted criteria for judging of that matter. There is no reason to doubt the patentability of Weiss' invention under any of the recognized criteria; but if patentable invention did stand in doubt, it is clear that the utility of the Weiss patent should determine this issue in favor of the respondent. The evidence as to the utility of the Weiss patent is full and conclusive. Approximately 2,000,000 pounds of DPG were used in 1925. Nor did the decision of the Circuit Court of Appeals result from that Court's confusing the patent in suit with Weiss' patent for the cheap commercial manufacture of DPG. The excerpts from the opinion of the Court below upon which petitioner relies to establish this confusion have been torn so violently from their context as to destroy their original meaning. The two patents are related though not identical. It is not disputed by petitioner that Weiss was the first man to effect a process for the cheap commercial manufacture of DPG. Kratz did nothing. Weiss, not by accident, but by long and persistent endeavor, worked out a process for the commercial manufacture of DPG. In view of this, there can be no doubt as to who really discovered the practical usefulness and, therefore, saw the commercial demand for DPG.

## ARGUMENT.

### POINT I.

**Weiss is entitled to date his invention of the patent in suit as early as March, 1918, for its conception and February-March, 1919, for its reduction to practice, under either of which dates he is first, sole, true and original inventor.**

Before discussing the evidence in the record under this point a brief reference to the authorities will indicate the position of the respondent. It is well settled that a patentee is entitled to date his invention as early as his first practical conception and disclosure thereof, provided thereafter he exercises reasonable diligence in reducing his invention to practice. If such diligence is not established reduction to practice is the earliest date that he may claim.

In *Christie* v. *Seybold*, 55 Fed. 69, 76, the present Chief Justice, delivering the opinion for the Circuit Court of Appeals for the Sixth Circuit, after reviewing the authorities upon the subject, stated the rule as follows:

> "It is obvious from the foregoing that the man who first reduces an invention to practice is prima facie the first and true inventor, but that the man who first conceives, and, in a mental sense, first invents, a machine, art, or composition of matter, may date his patentable invention back to the time of its conception, if he connects the conception with its reduction to practice by reasonable diligence on his part, so that they are substantially one continuous act."

In *Merrow* v. *Shoemaker*, 59 Fed. 120, 122, Circuit Judge Dallas stated the same principle in the following language:

> "The complainant contends that he disclosed his invention and so described its details that it was fully understood by the persons to whom he disclosed it, prior

> to June 16, 1887. If so, he has established his date of invention as not later than that day, and the question of anticipation must be solved with reference thereto, provided that he was duly diligent in filing his application for a patent, and in constructing his machine."

The subject was again elaborately reviewed by the Circuit Court of Appeals for the First Circuit in *Automatic Weighing Machine Co.* v. *Pneumatic Scale Corp.*, 166 Fed. 288, 301. Therein, Judge Colt stated that the rule was a result of the amendment of the patent statute by Section 15 of the Act of July 4, 1836 (5 Stat. 123). He said:

> "This amendment introduced a new and just principle into the patent law, inasmuch as it protected the first conceiver of the invention by permitting him to carry back the date of his invention to the time of his drawing and disclosure, provided he was using reasonable diligence in adapting and perfecting his invention."

This Court gave its sanction to this doctrine in *Loom Co.* v. *Higgins*, 105 U. S. 580, 594.

From the foregoing it is apparent that if the Weiss experiments of February and March, 1919, amounted to a reduction to practice, he is entitled to date his invention as of that time, and further, subject to the exercise of reasonable diligence in perfecting his invention, he is entitled to go back to the date of his first mental conception and disclosure to Carlton in March, 1918.

For purposes of the present case either date is satisfactory to the respondent, since the major defense is based upon the Kratz lecture of September, 1919, and since other alleged defenses are based on experiments conducted prior to March, 1918.

## (a.) THE EVIDENCE.

### *The First Conception of the Invention.*

In March, 1918, Weiss had been in the employ of the Republic Rubber Company of Youngstown, Ohio, for several months as a research chemist. He was a subordinate in the laboratory, confined in his activity to the work laid out for him by his superiors. The company was engaged in the manufacture of rubber articles, and a substantial part of its output consisted of products made from shoddy, *i. e.*, reclaimed rubber, averaging about 40% pure rubber.

The various commercial accelerators then in use were subject to various defects—some to one defect, some to another (R., p. 39). It was known that the shortening of the curing process was not only itself an economy but that it resulted in an improved product by preventing the breaking down of the the rubber from exposure to heat, *i. e.*, so-called depolymerization; and further that *certain* accelerators were capable of imparting improved qualities to the product in varying degrees apart from the results merely of speeding up the process (R., p. 37). Rubber chemists were seeking, therefore, not merely faster accelerators, but accelerators capable of imparting to the product these improved qualities. Mere speed in an accelerator was not enough. Faster accelerators than DPG were known even then. (See Cranor's paper, Plaintiff's Exhibit 23, R., p. 783, and testimony of Kratz, R., p. 417.) Superior quality of the product was not *necessarily* related to speed. A more detailed consideration of the requisites of a *commercially usable* accelerator will be found at pages 1-9 of this brief.

At this time the chemists at the Republic Company were engaged in an attempt to develop new accelerators and processes for manufacturing them. Weiss' chief superior was Monroe H. Daniels; his immediate superior, Clinton A. Carlton. Carlton left the employ of the company in the latter

part of March or the early part of April, 1918 (R., p. 90). *This date is important* because Carlton testified (R., p. 93) that shortly before he left, Weiss explained to him his belief that DPG had the qualities requisite in an accelerator, at least that it was sufficiently promising to warrant experiment with it. Weiss fixes the date of this disclosure as some time in March, 1918 (R., p. 89).

It does not appear certainly that Daniels was informed of Weiss' idea at this time; but he evidently soon learned of it, for he testified that toward the end of 1918 Weiss told him that he had an idea "about the *production* of DPG," and that he told Weiss to go ahead if he had such an idea, "because I felt that we ought to have just as many accelerators in the plant, and have the use of them, as we could possibly get" (R., p. 204).

This instruction of his clearly indicates that Weiss had already convinced him that DPG might be a speedy and effective accelerator in the improvement of rubber products. It is evident, then, that Weiss is corroborated by both his superiors in his testimony that in 1918 he conceived the idea of the patent in suit and disclosed it to Carlton and Daniels.

*The Early Experiments and the First Success.*

Weiss expected to test his conception by actual experiment but it was necessary first to devise a means of producing DPG. At that time, it was a laboratory product, not obtainable in the market. In May, 1918, he searched in the public library at Youngstown for a method of preparation (R., p. 102), and later in June of that year while on his vacation in New York, he obtained additional information from which he was able to start the actual preparation of DPG in September, 1918. Upon the departure of Carlton, however, Weiss' duties increased and in consequence he was limited in his work on DPG to what spare time he could find (R., p. 103).

After several experiments in methods of production, he finally obtained about five grams which he proceeded to test out in a rubber compound. It is to be noted that the formula on which he first tested DPG was the one habitually used by him for first tests with a new accelerator. *Throughout the X-book every new accelerator tried by Weiss appears first to have been tried out in this compound.* It consisted of 50 parts of pure rubber, 43 zinc oxide, 4 sulphur, 2 magnesia, plus the accelerator. For his first test he used one part DPG and cured the "mix" for 50 minutes at 40 pounds steam pressure, a normal time with then known accelerators. An overcure resulted (R., p. 105). This convinced him that the accelerator he was using was more powerful than those then in use in the industry.

Weiss was assisted in this experiment by William Halliday, a laboratory handy-man, who testified that he recalled the series of experiments by Weiss now being recounted (R., pp. 234, 235).

Halliday did not testify in the *National Aniline* case.

His second experiment with the same compound was cured 40 minutes at 40 pounds. It resulted in another overcure (R., p. 105). A third at 30 minutes and 40 pounds likewise was overcured (R., p. 107). It was clear that the time for cure could be cut at least in half with DPG.

These three tests exhausted the DPG on hand, and in the preparation of an additional quantity, Weiss improved his production process (R., pp. 107, 108). With his new supply, he again cured the same mixture, this time for 30 minutes at 30 pounds, and again obtained an overcure, although this time the overcure was not so marked as in the first three tests (R., p. 108). In his next test with the same compound for 20 minutes at 30 pounds, he obtained an excellent cure. He then cured a batch for 15 minutes at 30 pounds but the product was undercured (R., p. 109). *The slab of rubber resulting from the successful cure, he then tested in a physical laboratory for tensile strength, elasticity, etc., and from the*

*unusual results of these tests, concluded that he had found approximately the right combination.* Thereupon he recorded his test in the X-book, kept by him in the laboratory at page X-2034E (R., p. 748). This is the test which bears the disputed date. The figure indicating the month appears to have been changed. It now reads February 10, 1919. A special discussion of this date is deferred at this point.

From this testimony it appears that there were at least six tests made during December, 1918, January and February, 1919, one of which was recorded. However, after completing the first three tests, Weiss showed the rubber slabs which had been overcured to Daniels, and told him his impression of the results and that he was starting to prepare more DPG in order to continue his tests (R., p. 111). This testimony is confirmed by Daniels (R., p. 204).

*The Later Successes.*

His next experiment appears at page X-2006G. (R., p. 731). It is not dated but from its column position in the X-book it is obvious that it took place prior to February 21, 1919, the date of X-2006H. In this test two parts of DPG were employed and an overcure resulted. The test was made for purposes of comparison with X-2006B, made July 26, 1918, in which TPG had been used (R., p. 114).

Thereafter two tests of DPG were made and recorded *concerning which there is no dispute.* One, appearing on page X-2006H, was recorded on February 21, 1919 (R., p. 731). It was made on a shoddy compound then in actual use in the Republic factory.

On the same day he made two other tests with the same compound, in one of which (X-2005H) no accelerator was used, and in the other (X-2005G), TPG (R., p. 731). A comparison of the physical test figures of the slabs resulting from these three tests shows the marked superiority of DPG. For purposes of convenient comparison the records of these three tests are set forth below:

| | DPG 2006H | No Accel. 2005H | TPG 2005G |
|---|---|---|---|
| C. Shoddy | 70 | 70 | 70 |
| Br. Crepe | 5 | 5 | 5 |
| Lime | 1 | 1 | 1 |
| Sulphur | 4 | 4 | 4 |
| D. P. G. | 2 | .. | .. |
| Barytes | 18 | 20 | 17 |
| T. P. G. | .. | .. | 3 |
| | 100 | 100 | 100 |
| Cure | 15/30 | 35/35 | 20/35 |
| Stretch | 10¼ | 11¼ | 11 |
| Tensile | 720 | 615 | 525 |
| Set | ⅝ | ¾ | 18/32 |
| Date | 2-21-19 | 2-21-19 | 2-21-19 |

The figures after the word "Cure" refer to the time and steam pressure, "15/30" meaning 15 minutes at 30 pounds. The word "Tensile" means tensile strength, and is the pull in pounds required to break a sample of rubber of standard cross-section by stretching it to the breaking point. *It is the most important physical quality in commercial rubber.* The left hand column indicates the greatly increased tensile strength of the product cured with DPG.

The figures for "Stretch" represent the number of inches to which a standard length of cured slab (usually two inches) can be stretched before breaking. Elasticity in shoddy compounds is always less than in compounds made from pure rubber. The qualities desired in shoddy compounds are toughness and strength which are related to tensile strength.

The figures for "set" are fractions of an inch. The same standard length of cured slab (two inches) is stretched almost to the breaking point, held at this point for several minutes, and then released. It does not contract quite to its original length. The length of the increment is the amount of the "set". Its absence, not its presence, is desired in a commercial product. As appears from the above figures the "set"

for the DPG slab and that for the TPG slab were about the same.

In the tensile strength of the product and in the time required for cure, two very important factors, DPG was markedly superior. Comparing the left hand and the right hand column, it will be seen that using 2/3 as much DPG as TPG, and curing for ¾ the time at 6/7 the pressure, a product having 37% greater tensile strength was obtained.

Again on March 4, 1919, another undisputed test was made, X-2024A (R., p. 753), with DPG. Again a shoddy compound was used.

This test was made for purposes of direct comparison with X-2042 blank (R., p. 753), recorded on the same day, in which one part of litharge was used as accelerator in exactly the same compound as that used in X-2042A. The comparative results of these two tests are set forth below:

| | Litharge 2042 Blank | DPG 2042-A |
|---|---|---|
| G. Shoddy | 68 | 68 |
| Hydrolene | 10 | 10 |
| Turps | 3 | 3 |
| Fossil Flour | 12 | 12 |
| Inertia | 1½ | 1½ |
| Lime | 2¼ | 2¼ |
| Sulphur | 2¼ | 2¼ |
| Litharge | 1 | .. |
| D.P.G. | .. | 1 |
| | 100 | 100 |
| S. G. (Specific Gravity) | 1.64 | 1.60 |
| Cure | 38/274 | 20/274 |
| Stretch | 3½ | 3½ |
| Tensile | 530 | 620 |
| Set | ⅛ | ⅛ |
| Date | 3-4-19 | 3-4-19 |

Here the stretch and set, as before, were equal; but the rubber cured with DPG had 90 pounds greater tensile strength,

though cured for but little more than half the time. The "274" in these tables means 274° F., which is about the equivalent of 30 pounds steam pressure.

The fact that these tests were made on shoddy compounds does not militate against their conclusiveness. Shoddy is reclaimed rubber. Old tires, hose, etc., are accumulated, treated so as to remove the sulphur, and reduced to a plastic mass. The percentage of pure rubber is from 30-75%. The X-book abounds in experiments made on shoddy compounds. The same accelerators are employed in them as in pure rubber compounds. The process of cure is the same. The chemical reactions are sufficiently alike to disclose the worth of an accelerator. There is not an iota of evidence in the record that accelerators cannot be tried out as effectively on shoddy as on virgin rubber. The story told by the X-book is all the other way.

Both of these shoddy tests were made on compounds actually in use in the production of commercial rubber products by the Republic Company. The figures speak for themselves. To the layman they convincingly demonstrate the marked superiority of DPG. To Weiss, a rubber chemist, they abundantly confirmed the accuracy of his discovery. Their success was to him a convincing practical application of what he had conceived and disclosed to Carlton nearly a year before. They showed him that he had an accelerator that would work better in shoddy compounds than anything he had known before. This was a goal he had been steadily seeking (R., pp. 116, 205, 613). There can be no doubt that they constitute a reduction to practice within the meaning of the patent law.

## (b) THE PETITIONER'S ATTEMPT TO EXPLAIN AWAY WEISS' SUCCESSES.

Only one serious effort was made by the petitioner to rebut the conclusion of superiority that these figures show. That

was the testimony of Bridgewater, a DuPont chemist, allied with a company eager to defeat the patent. The value of his testimony may be gathered quickly from comparative tables. He referred first to tests X-2006H and X2005H, set forth *supra*, page 33, and pointed out that the DPG compound resulted in 105 pounds greater strength than the no-accelerator compound (R., p. 494). He neglected to mention the fact that the DPG compound was cured in 15 minutes as against 35 for the other, and at 30 pounds pressure as against 35. Nor did he point out that on the same day 50% more TPG in the same compound resulted in a slab 195 lbs. weaker.

He then considered X-2006 Blank and X-2006B which are set forth below:

| | Litharge X-2006 Blank | T.P.G. X2006B |
|---|---|---|
| C. Shoddy | 93 | 93 |
| Lime | 1 | 1 |
| Litharge | 3 | .. |
| Sulphur | 3 | 3 |
| T.P.G. | .. | 3 |
| | 100 | 100 |
| Cure | 30/40 | 15/40 |
| Tensile | 430 | 730 |

These tables plainly show the superiority of TPG over litharge in this particular compound. But the learned Mr. Bridgewater drew the amazing conclusion that because TPG was superior to litharge in a compound based on 93 parts of C. Shoddy and 3 of sulphur, TPG must be superior to DPG, because DPG had been only 105 pounds better than no accelerator in a *different* compound consisting of 70 parts of D. Shoddy and 4 of sulphur, cured for *different* times under *different* pressures (R., p. 495). The comparison obviously is made between altogether different tests having no relation to one another.

Petitioner further seeks to have this court infer from the behavior of the Republic Company that Weiss' work prior

to the reading of the Kratz paper September 6, 1919, was wanting in conclusiveness and that it was that paper which changed things at the Republic Company. The fact that during this period the Republic laboratory was engaged chiefly on TPG is emphasized as well as the fact that the Republic Company contemplated the erection of a TPG plant. This it is contended was changed after Daniels heard the Kratz lecture. His caution thereafter to Stevens, one of his assistants, not to spend too much time in the future on TPG is quoted: "Diphenyl is the Kingpin now".

This argument of petitioner's seems plausible enough unless it is remembered that *Kratz's statements in his paper showed that MPG was just as good as DPG.* If the petitioner wishes to make a behavioristic approach, it must be thoroughgoing. It must explain the exclusive concern of the Republic Company with DPG when Kratz said MPG was just as good. To respondent it seems that the behavior of Daniels and those in charge at Republic shows just one thing, that Kratz's paper convinced them that what the humble Weiss had been telling them was true—that DPG really was the King pin. This conclusion is fortified by the further fact that although many learned chemists heard, or heard of, the Kratz paper, only at Republic did any work on DPG ensue. Prior information seems the only explanation of this behavior.

The petitioner's discussion tends to blind the reader to the fact that the question is not whether Daniels and others at Republic were actually convinced in 1918-19 by what Weiss told them but whether as competent chemists and reasonable men they should have been. In this view Daniels' alleged admission that he told his superior Clark that he "wasn't prepared to say how good it (DPG) was" becomes unimportant. It is submitted that the analysis of Weiss' results already given shows that Daniels and others at Republic should have been convinced of the practical efficacy of DPG, whether they were or not.

Neither should the fact be obscured in the mind of the court that it was only necessary that these February-March, 1919 experiments by Weiss be conclusive as to the *efficacy* of DPG as an accelerator. Invention does not depend on *superiority*. Efficacy and utility are the contributions to the arts which the patent laws protect. The tests showed superiority but mere efficacy would be enough.

### (c) FACTS AND EVENTS CORROBORATIVE OF WEISS' CONCEPTION OF HIS INVENTION IN MARCH, 1918, AND ITS REDUCTION TO PRACTICE IN FEBRUARY-MARCH, 1919.

The corroboration of Weiss by Carlton, Daniels and Halliday was further buttressed by the affidavits of Messrs. Seil and Greenwald, executed long before this patent litigation arose, at the time of the application of Weiss for the patent. Seil's affidavit (R., p. 904) states that prior to the month of April, 1919, he met Weiss in Youngstown and in the course of a conversation about accelerators for rubber compounds, Weiss told him that he had been working on the production of DPG as an accelerator and that DPG had proved to be very efficient for that purpose. This affidavit was executed on February 23, 1922.

Greenwald's affidavit, executed February 24, 1922, states that some time between October 26, 1918, and May 6, 1919, while serving as a Lieutenant in the Sanitary Corps, at Camp Meade, Maryland, he received a letter from Weiss from Youngstown offering him a sample of DPG for experimental work and stating that DPG had been produced by him for use in the acceleration of the vulcanization of rubber compounds (R., p. 905). Greenwald had been an associate of Weiss from 1912 to 1916 in the Harriman Research Laboratory and in another laboratory in New York (R., p. 87).

Subsequent events likewise corroborate the facts just stated. During the summer of 1919, Weiss was busy on his method of manufacturing DPG (R., p. 206). During the sum-

mer of 1919 he prepared several hundred grams. This was in the laboratory and available for the use of himself and of Daniels (as the latter testified) *before* the latter attended the meeting of the American Chemical Society in September, 1919, when the Kratz lecture was delivered (R., pp. 206, 210). Several hundred grams of this uncommon chemical would not have been produced unless its utility in the industry served by that laboratory were known. Nor would Weiss have labored to perfect his process for the manufacture of DPG, had he not been convinced of its commercial utility. This process was perfected when he left Republic in March, 1920.

Commencing in April, 1918, the X-Book shows many substances tested and recorded by Weiss as possible accelerators, and all in the standard rubber accelerator test recipe. It is very significant that though he tested many substances to find what he was looking for prior to February 10, 1919, yet when he recorded the very successful result with DPG of that day on page 2034E, he believed he had found the ideal accelerator he was searching for, because the X-Book shows that from *then* to the end of his employment with Republic he did not prepare for test *another single substance* as a possible accelerator. Thereafter his effort was directed to making this excellent accelerator commercially available by perfecting a process for its cheap manufacture.

## (d) THE PETITIONER'S ATTACK UPON THE CREDIBILITY OF RESPONDENT'S WITNESSES.

[NOTE: *Before going into this matter, respondent would like again to call the Court's attention to the fact that the two shoddy tests of February 21, 1919 and March 4, 1919, which are undisputed constitute a clear reduction to practice before the Kratz paper of September 6, 1919.*]

### *Nellen.*

The petitioner did not cross-examine Nellen. He now attacks Nellen's testimony as amounting to nothing for the

reason that although Nellen remembered and testified that Weiss had spoken to him of the use of DPG as an accelerator, he could not place the date any more exactly than sometime between February 1 and November 1, 1919.

Petitioner has nothing to say as to the rest of Nellen's testimony which was to the effect that Nellen had given to Weiss during this period at the latter's request for use in testing DPG the formula shown on Plaintiff's Exhibit No. 5, to be found at R., p. 721. Cf. R., p. 199. The witness identified the exhibit as being in part in his own handwriting. He stated that he had given it to Weiss in response to the latter's request for a cheap shoddy formula in actual use in the factory upon which to try DPG (R., pp. 230-231). Nellen could not say as to the date closer than already noted but Weiss testified that the occurrence was "late in the summer of 1919" and "sometime in August 1919" (R., p. 118).

Therefore if it can be shown that Weiss was not lying it will be helpful in combatting the petitioner's attack on Weiss' credibility as well as corroborative of Weiss' testimony that he was working with DPG in the summer of 1919 prior to the delivery of the Kratz paper on September 6, 1919.

If the Court will turn to page 736 of the record and observe the test recorded in column H of the left-hand photostat and will compare that formula with that in Plaintiff's Exhibit No. 5, it will see that they are identical with the exception of the amount of filler (zinc oxide) used and the amount and the kind of accelerator. In the test recorded in the left-hand X-2010H at page 736 of the record, the accelerator is "Trifan", which was the factory code name for TPG (R., p. 119), whereas in the original formula given to Weiss by Nellen the accelerator is "cromite", the factory code name for "thio" (R., pp. 187 and 229). In substituting TPG for "thio" the parts of accelerator had to be cut from 4 to 1 and the parts of filler (zinc oxide) increased by 3 to keep the total 100 in accordance with the usual practice.

The date of the test recorded at page 736 of the record is September 6, 1919. Thus it is established that on the day Daniels was in Philadelphia listening to Kratz (R., p. 228) Weiss was in Youngstown working with this formula gotten from Nellen, by Nellen's testimony, for use with DPG. Thus Weiss is corroborated in his testimony to the extent that the time of his speaking to Nellen was before the Kratz lecture and Nellen's testimony, contrary to petitioner's assertion does corroborate Weiss as to his work upon DPG in the summer of 1919 prior to the Kratz lecture.

*Halliday.*

Petitioner's objection to Halliday's testimony is that Halliday undertook to pick out a single test from among thousands with nothing unusual in the test so singled out to earmark it and fix it in Halliday's mind. The petitioner would be right in its position if it were right in its facts; but it appears from Halliday's testimony that there was a great deal to fix the particular series of tests in his mind.

It seems Halliday, the compound mixer, resented the fact that Weiss checked up carefully on his mixing, thinking that it impugned his own accuracy. Therefore when the first of the DPG test slabs came out badly overcured, he was glad of the opportunity to gloat over his superior; but much to his surprise Weiss persisted with the apparently "rotten mix", asking for more cures until a good one was gotten. The unusual shortness of the successful cure plus his lost opportunity to gloat over Weiss seems to have fixed the occurrence in his mind.

*Carlton.*

The attack on Carlton's credibility is to be found at the bottom of page 39 and the top of page 40 of petitioner's brief. It will be seen that the attack is based on some alleged inconsistency between the affidavit to be found at page 1003

of the present record and a certain other affidavit alleged to have been executed in the *National Aniline* case. The latter affidavit is not among those parts of the *National Aniline* record printed as a part of the record in the present case. Neither is there any reference to it in the *National* record. In addition, the nature of the inconsistency between the two affidavits is not stated. Under the circumstances, respondent is at a loss how to make answer.

*Daniels.*

There are three attacks on Daniels. The first is that he and his superior, Clark, were at odds in their testimony as to whether there was discussion as to dismissing Weiss from the employ of the Republic Rubber Company during 1919 and, also, as to whether Daniels told Clark during the spring or summer of 1919 of Weiss' work on DPG. It seems unnecessary to call either man a liar in accounting for this inconsistency. The matters testified to were at the date of the trial six or seven years in the past. Either may well have been honestly mistaken and it is an open question as to which was in error.

The second attack on Daniels' credibility is based on an affidavit given by him in the *National Aniline* case and reproduced at page 999 of the present record. In that affidavit Daniels referred to the undated experiment entered at page X-1777, column "blank" of the Republic X-book (R., p. 724), as having been performed in the early part of 1919. At the trial in the present case he testified that it had been performed the latter part of 1919 or the first part of 1920. It is stated that the adjacent pages show from a cursory inspection that the experiment must have been as he testified at the trial and not as he swore in the affidavit made in the *National Aniline* case.

***This is simply not so.*** If the Court will run over the pages from the X-book reproduced in the present record, it will be seen at once that there is no coincidence between the numeri-

cal sequence of the pages of the X-book and the chronological sequence of the experiments.

This is shown by the following examples:

| *Page of X-Book* | *Page of Record* | *Date of First Entry* |
|---|---|---|
| X-2019 | 741 | 11/27/17 |
| X-2021 | 742 | 10/11/17 |
| X-2026 | 644 | 6/11/18 |
| X-2027 | 745 | 2/27/18 |
| X-2050 | 757 | 8/28/19 |
| X-2051 | 758 | 8/20/17 |
| X-2053 | 759 | 19/3/19 |
| X-2055 | 760 | 8/25/17 |

The above dates are in every case the first entry on the pages in question. There are many other examples of this sort in the record.

The entry in question is the first, last and only one on the particular page.

The petitioner says respondent's counsel said this variance in Daniel's testimony was inconsequential. Respondent's counsel has no recollection of making any such assertion; but it was said below and, respondent still believes, that Daniels made a simple error in the date of an occurrence some six years in the past. He truthfully corrected the error in his testimony in the present case and it is submitted that his action in so doing should not discredit him.

The final objection to Daniels is that he deliberately deceived the Patent Examiner and thereby induced him to issue the patent in suit. This is a serious charge if true. It is based solely on the fact that in the affidavit filed by Daniels in the Patent Office in connection with Weiss' application for the patent in suit, Daniels stated (R., pp. 909-910):

> "During the early part of the year 1919 said Weiss produced diphenylguanidine as an accelerator for rubber compounds, and during the early part of that year made numerous tests of the same as an accelerator in vulcanizing rubber. These tests were also carried out in the

compounding laboratory for the various departments of the Republic Rubber Company at Youngstown, Ohio, and the accelerator proved to be highly efficient as an accelerator in the actual vulcanization of rubber goods, such as hose, tires, belts, valves and other mechanical goods."

Respondent concedes that the language quoted can carry the meaning for which the petitioner contends, to wit, that DPG was used in the actual manufacture of commercial products at the Republic Rubber Company. But it must be remembered that Daniels executed this affidavit with full knowledge that the X-books contained the true story and that other persons at the Republic Rubber Company were conversant with the facts. It seems incredible that under these circumstances he would consciously pervert the truth. It must be remembered, in addition, that it was not necessary in order to enable Weiss to obtain his patent that the affidavits filed should declare that DPG had been used in the actual manufacture of commercial products. It was necessary only that they declare that tests had been made demonstrating its efficacy for that purpose. Daniels knew that DPG had been actually used in vulcanizing rubber compounds of exactly the sort which would be used for making "rubber goods, such as, tires, belts, valves and other commercial goods". While respondent concedes that the thought is awkwardly expressed in the affidavit, it submits that the only view really tenable is that Daniels meant to say that DPG had "proved to be highly efficient as an accelerator" for the purpose of "actual vulcanization of rubber goods, etc.". It should not be overlooked that the affidavit is typewritten. The ineptness of expression may be due to a typist's error which Daniels failed to notice before signing the affidavit. At any rate, since the use in the actual manufacture of hose, tires, etc., did not need to be declared in order for Weiss to obtain his patent, it is submitted that petitioner's charge that the patent in suit was procured by a

misrepresentation of the essential facts is quite without foundation.

It is not without significance that Daniels was not confronted with this affidavit on cross-examination at the trial and then given an opportunity to answer the charge of dishonesty laid to him by the petitioner.

*Weiss.*

The first ground for impeachment of Weiss' testimony upon which petitioner relies is the fact that Weiss failed to recollect exactly what time in the June seven years previous to the trial he had taken his vacation. (Pet. br., p. 40.) Surely such an error is no ground for impeaching the credibility of a witness.

The next complaint (Pet. br., p. 40) is that at the trial Weiss testified that he had made five grams of DPG in September, 1918, and had tested it on rubber compounds in December of that year, whereas in an affidavit filed in the *National Aniline* case he stated that, on the basis of information gleaned at the New York Public Library on his vacation in June, 1918, he prepared a small quantity of DPG at Republic in September, 1918, but that the amount prepared at *that* time was not sufficient to permit a test in a rubber compound. Counsel for petitioner characterize this as "an unexplained and unexplainable variance on the all-important point of when Weiss first made DPG, etc." They say Weiss admitted the inconsistency of his testimony. *As a matter of fact,* in his answer to XQ247 on page 143 of the Record, Weiss refused to admit that the affidavit was not reconcilable with his testimony at the trial of the present case. That answer should be compared with his answer to Q56 on page 103 in which he states that he made *two* experiments in the preparation of DPG in September, 1918, one of which was discarded, but that when he got through, he had about five grams of DPG.

The same complaint is made (Pet. br., p. 44) as to inconsistency between the date given in the affidavit for the making of the second batch of DPG and the date given for that work in Weiss' testimony at the trial. (Pet. br., pp. 44-45.) The affidavit states (R., p. 143) that in September, 1918, he "did not have sufficient data to produce any *considerable* quantity of diphenylguanidine" (italics ours) and that in January, 1919, he visited the library of the Carnegie Institute in Pittsburgh and obtained information as to various laboratory methods of making DPG and that upon his return to Youngstown in the middle of January he prepared sufficient DPG and tested it out soon thereafter in a rubber compound. The testimony alleged to be inconsistent is to the effect that Weiss made his *second* batch of DPG before the Pittsburgh trip. Obviously the affidavit does *not* say the *second* batch was made *after* the trip. It doesn't *mention* the *second* batch. Weiss pointed this out clearly on cross examination and also the fact that the language in the affidavit dealt with his efforts to perfect a means of producing DPG in *"considerable"* quantities—*i. e.*, with the development of his invention for the cheap production of DPG, covered by a patent not here in suit. There is no "unexplained or unexplainable variance" involved anywhere save in the imagination of counsel for petitioner.

Counsel for respondent request the court to read carefully in the light of what has been said Weiss' cross-examination (R., pp. 141-145). Counsel feels that the record tells its own story.

Complaint is made (Pet. br., p. 45) of Weiss for not having recorded in the X-book his early experiments prior to February 10, 1919, despite the rule of the company requiring it. There seems to have been such a rule but both Brill (R., p. 303, Q36) and Daniels (R., p. 220, XQ120) seem at times also to have been guilty of departures from it. Petitioner states Weiss claimed a special dispensation for himself. *This is not so.* He said he had been given no definite rules, that

it was his understanding that he was to use his discretion as to what was to be recorded and when, and that he did not record the early experiments with DPG in December, 1918, and January, 1919, because he regarded them as incomplete. As soon as he achieved success, it is to be noted, the results were recorded beginning with the experiment of February 10, 1919. In view of the great difference in speed between DPG and the accelerators to which he was accustomed it is incredible that this first recorded success was not preceded by some unrecorded experimenting.

In the next breath (Pet. br., p. 47), the petitioner seeks to repudiate the X-book itself despite his earlier complaint that Weiss did not use it to record all his work. The complaint is that at the trial only Weiss interpreted these entries. Who but Weiss should? Petitioner seems to mistake completely the purpose of the X-book exhibits. They are in corroboration of Weiss' oral testimony. The X-book entries were made years before the application for the patent in suit and Weiss has had no opportunity since to alter them. The existence of these X-book entries under these circumstances constitutes a perfect documentary corroboration of Weiss' testimony in reference to the matters to which the entries relate.

Complaint is made (Pet. br., p. 49) that one of Weiss' DPG entries, X-2006G, is undated but there are dozens of undated entries in the X-book pages that have been put in as exhibits in this case. See, for example, R., pages 724, 726, 727, 728, 729, 730, 731, 732, 734, *et al.* Almost every page from the X-book has one or more.

The next complaint is that Weiss tried to link X-2010H (right hand) with X-2010H (left hand) to be found at page 736 of the record. The right hand entry is dated "9/29/19." The left hand entry is dated "Sept. 6-19" and is the entry we discussed in connection with the attack on Nellen's testimony at pages 39-41 of this brief. Reference to that will show that Nellen's testimony, taken with this X-2010H left hand entry, was strongly corroborative of Weiss' testimony to his

work on DPG in the summer of 1919 prior to the Kratz lecture on September 6 of that year. By the same token it increased Weiss' credibility.

If the X-2010H right hand entry is inspected the court will see that the formula used is the same as that in the X-2010H left hand entry with the exception of the accelerator used which in the right hand entry was "Diffendoe." This was the factory code name at Republic for DPG (R., pp. 208, and 117.) In other words the formula was the formula which Nellen testified he gave to Weiss to use for testing DPG. The entry corroborates Nellen in his recollection by showing that Weiss *did* use the formula *which the left hand entry shows he must have gotten on September 6, 1919, or earlier* for the purpose for which Nellen said it was obtained. This is the reason the two entries should be tied together. The court will certainly agree that witnesses whose testimony dovetails thus perfectly cannot be easily impeached.

Nellen's testimony on the above matter together with its documentary corroboration also shows that on September 6 or earlier Weiss had or expected to have DPG for making tests. This should be considered in relation to Weiss' testimony that he made DPG in August, 1919, which petitioner complains of as uncorroborated. (Pet. br., p. 50). Respondent agrees with petitioner that it would be hard for Weiss ordinarily to be sure five years afterward whether this DPG was made in August or September but the X-book entries, coupled with Nellen's testimony, make it seem at least highly probable that Weiss' recollection was accurate.

As to the "inner-tube-splicing-cement" incident (pet. br., p. 51) this is the same experiment discussed *supra* at pages 42 and 43 in connection with the attack on the witness, Daniels, and recorded in the Republic X-book at page 1777 (R., p. 724). The assertion is made that Weiss and Daniels are in conflict as to the date of this experiment and that Daniels is "obviously" correct—that is, that Weiss plainly disregarded the truth in his testimony. As the respondent has al-

ready shown *supra*, there is nothing "obvious" about the date from the record of this experiment—in fact, it is impossible from the X-book entry to determine whether it was Daniels or Weiss that was in error. Respondent places no reliance on this test and it is therefore unnecessary to fix its date; but respondent does wish to insist that there is no basis for the imputation of petitioner that Weiss disregarded the truth in his testimony.

At page 52 of his brief petitioner makes a very extended complaint as to Weiss' testimony regarding the date of certain undated tests appearing on the six columns of page X-2066 of the X-book (R., p. 765). The first complaint is that Weiss testified that these experiments were made in the summer of 1919 when the X-book pages next preceding X-2066 contain experiments dated September, October, November and December 1919 and those next following contain experiments dated in 1920. Respondent has already had occasion to point out in meeting the attack on Daniels at page 43, *supra* the want of any correlation between the chronological sequence of the entries in the X-book and the numerical sequence of the pages thereof. At that point several examples of this want of correlation were given. The same examples are pertinent here.

Petitioner proceeds:

> "Furthermore, when Weiss was on the witness stand in the *National* suit and told about his two tests with shoddy compounds and the one test with the changed date, he was asked if the X-book contained any other record of a test with DPG made prior to September 2-6, 1919, and was instructed to go through the X-book in search of any such test, and at no time did he ever suggest that these entries on page X-2066 or any others in the X-book, except for the three above identified, were made prior to September 2-6, 1919 (Vol. 1, pp. 170-1, Q398-403, and Nat. Rec., pp. 280-1, Q428-30)."

The fact is the reference to the *National* record shows that counsel for the defendant in that case, in cross-examining

Weiss, made the "instruction" referred to, telling Weiss to go through the X-books during the noon recess and to call counsel's attention to it after the recess if he found any other experiments antedating the Kratz paper. After the noon recess counsel for the defendant cross-examined Weiss on other matters and never returned to the matter of the early experiments. Counsel for respondent submits that the burden of cross-examination can not thus be shifted to the witness and afterwards made the basis of an attack on the witness' credibility.

The testimony of Haring, the hand-writing expert, to which petitioner also refers on page 52 of its brief, is commented on *infra* page 51 in the discussion of the disputed experiment of February 10, 1919.

At pages 53 and 54 of its brief, petitioner quotes from what it refers to as Exhibits D and VV in the present case. Neither is printed in the present record and counsel for respondent has neither exhibit before him as he writes; but the portion of these exhibits quoted by petitioner seems a sufficient answer in itself. The contention is that Weiss should not be believed because he was not believed in an interference proceeding in the patent office. The quotation shows that the Examiner denied credence to the testimony of Weiss because he sought to "intimidate" witnesses on the other side by threat of uncomfortable cross-examination if the witnesses made certain statements which Weiss knew to be false. The respondent would like to ask since when a threat to cross-examine to bring out the truth has constituted intimidation of a witness. The ruling of the Examiner was plainly error.

The same sort of an attack is made on respondent's witness Woodward. Respondent suggests that this Court turn to pages 646 and 647 of the record and see the attitude of the trial court on this attack on Woodward. It is submitted that the trial court was right. The facts actually were harmless as the court surmised.

*The Disputed Test of February 10, 1919.*

With reference to this test, the petitioner maintains that the figure "2", indicating February, was built over a "9", indicating September. He says Weiss admitted that the figure had been changed and that he had changed it. (Pet. br., p. 47). As a matter of fact, Weiss said it looked as if it had been changed and that *probably* he had written a "1" first, indicating January, as one sometimes inadvertently will in early February, and that *probably* he had then changed it. There are instances of such changes elsewhere in the X-book. See, for example, X-2045A. (R., p. 755). Weiss did not pretend to any recollection of the matter. (Rec., p. 153.) He was not so ready to impute dishonesty to the petitioner as petitioner has been to impute such conduct to Weiss. The alleged change, of course, makes the difference betwen an experiment antedating and one postdating the Kratz lecture of September 6, 1919.

The X-book page is 2034, column E. (R., p. 748). An enlargement of the doubtful figures appears as plaintiff's Exhibit 10 (R., p. 749). The petitioner introduced one Haring, a handwriting expert, who purported to describe in detail exactly how the alteration was made, even to the angle at which the pen was held and the manner in which the nibs were spread (R., pp. 449, 450). His testimony is commended to the Court for what it is worth. This is indeed an age of experts!

This expert likewise presented defendant's Exhibits AA, BB and CC (R., pp. 966-968) in which he had painted out with Chinese white all that was necessary to make what was left look like a nine (R., p. 451). These pictures are the best condemnation of this expert's testimony.

The court should bear in mind that Weiss never saw the X-book from March, 1920, until it was produced in the National Aniline trial in 1923. Prior to March, 1920, he had no motive for altering the date. He had not been advised

that his discovery was patentable, and in fact, had been told that it was not. No thought of building up a record for future controversy was in his mind. After he had a motive for alteration, he was without opportunity therefor.

Moreover, there were plenty of places for Weiss to have inserted early dates on DPG tests which are undated in the X-book, if he had had any desire to falsify his records. Page 2066 contains several undated DPG tests. *It would be astonishing stupidity to alter the date of one test when blank tests could have been dated, if there had been any base motive at work.*

It is important to notice the composition of the compound used in the disputed test—50 parts pure rubber (smoked sheets), 43 zinc oxide, 4 sulphur, 2 magnesia, and 1 DPG. Throughout Weiss' records in the X-book, as a careful examination will disclose, new accelerators were regularly tested first on a rubber compound of this recipe. Weiss testified that the first thing he did with any accelerator was to test it on the rubber. (R., p. 173.) Thereafter factory compounds with shoddy were tried out. So here, the shoddy tests of February 21, and March 4 were preceded by the rubber test of February 10th, 1919.

At page 48 of its brief, petitioner seeks to discredit this test by the statement that although in the present case Weiss stated that this test on pure gum stock (X-2034 E) was the first he made, in the *National* case he testified at page 229 of the record therein that "his 'first thought' after he had made some DPG was to see how it would work with shoddy." But plainly this was a mere statement by Weiss of his interest in shoddy at this time. It is no statement of the order of the tests. On the very next page of the *National* record he states definitely that he had made a recorded test with a test formula that was earlier than the first shoddy test—that is, the test of February 10, 1919. There is no inconsistency in Weiss' testimony in the two cases that respondent can discern.

Careful examination of the Republic X-book shows that during the period of Weiss' employment up to and including the date of the Kratz lecture in Philadelphia, he investigated the properties of twelve new substances not in use at Republic as accelerators for the vulcanization of rubber, and that in every case his first test was in the standard accelerator test compound of

| | |
|---|---|
| Rubber | 50 |
| Zinc | 43 |
| Sulfur | 4 |
| Magnesia | 2 |
| Accelerator | 1 |

This is the formula of the disputed test. The other initial tests of new accelerators with this formula are recorded as follows:

| *Page* | *Date* | *Accelerator* |
|---|---|---|
| 2031-E | 6/17/18 | T. P. G. |
| 2031-C | 6/ 7/18 | Anhydro formal anilide |
| 2034 | 10/22/18 | Phenylthiourea |
| 2034-E | 2/10/19 | D. P. G. |
| 2031-A | 6/ 7/18 | Frazars accelerator |
| 2031-B | 6/ 7/18 | Di cyandiamid |
| 2031-D | 6/ 7/18 | P-diamido diphenyl methane |
| 2031-F | 6/ 7/18 | P-toluene sulfanide |
| 2034-B | 10/22/18 | Anhydro formal anilide |
| 2034-G | ..... | Distilled thorax |
| 2034-H | ..... | Virginia bark |
| 2039-G | ..... | Phenyl urea |

These entries would seem to furnish ample corroboration of Weiss' testimony that it was his habit to test all potential accelerators in this compound before determining their value in other types of compounds. In the case of the disputed test of February 10th there was no reason shown for a departure

from his usual practice and it is reasonable, therefore, to believe that the date shown in the X-book is the true date of the test.

### (e) RECAPITULATION.

Respondent has gone fully into the attack on the credibility of its witnesses, not because it deems it essential that they be believed as to the matters as to which petitioner has attacked their testimony; for the undisputed tests of February 21, 1919 and March 4, 1919 establish a date for the Weiss invention, sufficiently early for the purposes of this case. Respondent has met squarely the attack on the credibility of its witnesses because respondent has desired to meet petitioner on petitioner's own ground. Respondent submits that every attack has been met. There is no reason why the testimony of respondent's witnesses should not be accepted in full.

Petitioner would have this Court believe respondent's case is built on perjured testimony and that that fact is obvious. A sufficient answer is that Judge Buffington and Judge Davis of the Third Circuit and Judge Manton and the late Judge Mayer of the Second Circuit have all been convinced of the merits of respondent's case. Judge Buffington, though resting the decision of the Third Circuit on the ground that the Kratz paper contained no disclosure of the patent in suit, went out of his way to say that he and Judge Davis, for the court, had reached the conclusion that the true date of Weiss' disputed experiment, X-2034E, was, as recorded in the X-book, February 10, 1919.

The petitioner, of course, emphasizes the fact that the trial judge in this case saw the respondent's witnesses and refused in part to believe them; but it is submitted that the foregoing analysis shows the trial judge too clearly wrong to permit of this Court's reinstating his findings. Moreover, it must not be forgotten that another trial judge, Judge Manton of

the Second Circuit, saw the same witnesses in the *National Aniline* trial, and *did* believe them. See Appendix.

It is submitted that the Court of Appeals herein was right and that plaintiff is entitled to date his invention as early as February 10, 1919 for its reduction to practice, and, in view of his diligence in the face of adverse conditions subsequent to his first practical conception and its disclosure in March, 1918, he is entitled to the benefit of that date, also, if that be necessary.

It follows that Weiss is entitled to the status of first, sole, true and original inventor as of one of these dates unless barred by the defenses presently to be discussed.

## POINT II.

### None of the defenses based on incidents prior to the Kratz paper of September 6, 1919, defeat the patent.

[NOTE: *To a proper understanding of what follows under this point prior perusal of pages 1-9 of this brief is necessary.*]

The petitioner contends that certain early work of Kratz is sufficient to defeat the patent, even if Weiss was able to date his invention in February-March, 1919. This work of Kratz properly belongs in three groups: (a) laboratory tests at Norwalk in the fall of 1916; (b) alleged actual acceleration with DPG of a mix for 300 tubes at the Falls Rubber Company in 1917; and (c) alleged laboratory work at the Falls Company in 1918. These will be considered in chronological order. In addition, two other defenses are advanced by the defendant: the so-called Baldwin experiment, appearing at page X-2005 Blank of the X-book, dated February 22, 1917, and the disclosures in the King and Twiss papers. These will be separately considered below under subheads (d) and (e). The paper of Du Bosc petitioner dis-

cusses solely as a "special matter" pertinent to the broader claims of the Weiss patent. Discussion of that paper is therefore to be found in this brief under Point IV (a) *infra*.

## (a) KRATZ' WORK AT NORWALK.

From April 1, 1914, until April 1, 1917, Kratz was in the employ of the Norwalk Rubber & Tire Company at Norwalk, Connecticut. It is not disputed that in 1916 he carried on some experiments designed to ascertain the comparative strength of various vulcanization accelerators when compared with sulphocarbanilide. These tests were recorded in the records of the Norwalk Company (R., pp. 952-956).

It is worth while to state in detail what was done. Using a compound of 200 parts rubber, 200 zinc oxide, 10 sulphur and 6 sulphocarbanilide (accelerator) cured for 60 minutes, at 50 pounds as a base, the "idea" as stated in the experimental record was "to determine the amount of the other substances necessary to be used in order to give same cure in the same time". The attainment of "cure" was to be determined by the observation of physical properties in the product, not by chemical analysis.

It is enlightening on the issue of anticipation to note the method of observation. By Kratz' own admission, the so-called "thumb and tooth" method was used (R., p. 404). That is, the learned doctor pulled and bit each slab of rubber to determine whether its cure was perfect or not. He did nothing more. No attempt to *measure* the physical properties of the cured slabs was made. In fact, Kratz frankly stated that he was not completely familiar with the more exact methods of testing (R., p. 404) and he could not say for certain whether the Norwalk plant in 1916 had even a single machine for making such tests (R., p. 404).

In contrast with the methods of Kratz are those of Weiss. In all of the experiments upon which respondent relied under Point I of this brief to establish the date of the Weiss invention, Weiss at the very least, measured accurately the

"stretch", "strength" and "set" of the product. In contrast with Kratz, Weiss was interested in the *useful qualities of the product* as well as the speed of the accelerator and was seeking, as he said in his patent application, "to *improve rubber compounds so that the finished product shall be of superior quality* and so that the time required for vulcanization shall be greatly reduced over that ordinarily required for that purpose."

As one among a group of other accelerators, DPG was tried out by Kratz in quantities, varying from three parts to five parts (R., pp. 351-352, 952). The results for the various accelerators were summarized on a separate sheet (R., p. 953). On the basis of 3% sulphocarbanilide *on the rubber* as a base (that is, 6 parts to 200), Kratz concluded that it would take 3.5% of aniline, 1.75% of TPG and .25% of DPG to accomplish the *same* cure in the *same* time. *Thus, on the basis of sameness of cure determined by his biting and pulling, Dr. Kratz assumed to carry his results* out to the hundredth part of 1%!

It must be clear to the Court, apart from the question of the accuracy of Dr. Kratz' determinations, that the percentages arrived at in the Norwalk investigation showed *absolutely nothing* as to the temperature at which curing starts with DPG, or with any of the other accelerators; *nothing* as to the protection they afford against overcuring; *nothing* as to the wearing and aging qualities of the product to be obtained by their use; and *nothing* as to the comparative physical properties of the rubber cured with the various accelerators, even at the moment of the completion of the cure. *In a word, the investigation showed absolutely nothing as to the practical utility of the substances investigated.*

Perhaps no further comment is necessary to show the impossibility of the Norwalk investigation as an anticipation of Weiss' invention. It may, however, be added that Kratz informed his superior, Russell, of his work (R., p. 355) and

that, though Russell remained at Norwalk, the Norwalk Company saw no advantage in using DPG as a result of these tests. Russell so testified (R., p. 1023). Neither did they make any practical application of any other information contained in Kratz' summary.

Kratz explains non-use by claiming inability to produce DPG in sufficient quantity at sufficiently low cost, but he was an experienced chemist and if he had seen the need for such production, no doubt he would have attempted to supply it. His Norwalk method (R., p. 954) and Weiss' process patent (R., opposite p. 1002) are very similar. In fact, the only difference is in the form of ammonia used. The only inference that can be drawn from his behavior and from that of the Norwalk Company is that nothing was discovered as to the practical utility of DPG in the rubber art.

The experiments were in secret and secret experiments do not defeat subsequent patents. As far back as the leading case of *Bedford* v. *Hunt*, 1 Mason, 302, 305, Mr. Justice Story said:

> "The intent of the statute was to guard against defeating patents by the setting up of a prior invention which had never been reduced to practice. If it were the mere speculation of a philosopher or a mechanician, which had never been tried by the test of experience, and never put into actual operation by him, the law would not deprive a subsequent inventor, who had employed his labors and his talents in putting it into practice of the reward due to his ingenuity and enterprise."

Again in *Agawam Co.* v. *Jordan*, 7 Wall., 583, 602, Mr. Justice Clifford states the principle:

> "The settled rule of law is that whoever first perfects a machine is entitled to a patent, and is the real inventor, although others may have previously had the idea, and made some experiments towards putting it into practice."

Very pertinent is the language of this Court in *Tilghman* v. *Proctor*, 102 U. S. 707, 711:

> "The accidental effects produced in Daniel's water barometer and in Walther's process for purifying fats and oils preparatory to soap-making, are of the same character. They revealed no process for the manufacture of fat acids. If the acids were accidentally and unwittingly produced, whilst the operators were in pursuit of other and different results, without exciting attention and without its even being known what was done or how it had been done, it would be absurd to say that this was an anticipation of Tilghman's discovery."

The sum of the Kratz investigation of DPG at Norwalk was that, using the same formula, and temperature, 0.25% DPG on the rubber made a slab, that, *when pinched and bitten by him, felt* the same *to him* as a slab made with 3% of sulphocarbanilide. In *Diamond Meter Co.* v. *Westinghouse Electric & Mfg. Co.*, 152 Fed. 704, 714 (7th C. C. A.) Judge Baker said:

> "Patents are granted for advances in the useful arts, not for increments of knowledge."

Possibly this was an "increment of knowledge", but, even this seems doubtful. As science, finding values to the hundredth part of 1% is absurd where the values are bottomed upon mere biting and pulling by the experimenter.

As an anticipation of Weiss' patent, it was clearly deficient in substance. If anything approaching Weiss' DPG rubber was produced it was "accidental * * *, not intended and not appreciated" and did "not constitute anticipation." *Eibel Co.* v. *Paper Co.*, 261 U. S. 45, 46. It must "be relegated to the class of unsuccessful and abandoned experiments, which, as * * * repeatedly held, do not affect the validity of a subsequent patent". *Deering* v. *Winona Harvester Works*, 155 U. S., 286, 301.

## (b) THE ALLEGED MANUFACTURE OF THREE HUNDRED INNER TUBES IN 1917.

Dr. Kratz testified that some time in September of 1917, while he was Chief Chemist for the Falls Rubber Company, two batches of rubber compound from which 300 gray automobile inner tubes were made, were accelerated by him with DPG (R., pp. 362 *et seq.*) The 300 tubes, he said, were part of an order of 1,000 tubes which were actually delivered to the Rubber City Clearing House. Shipping documents covering a shipment of 1,000 tubes to such consignee were introduced in evidence as defendant's Exhibit T. (R., p. 958.) There is nothing in these documents to corroborate Kratz' oral statement that he used DPG as the accelerator. Petitioner endeavored to corroborate this statement by introducing his Exhibit S (R., p. 957), purporting to be a laboratory record of experiments carried on in preparation of a tube stock that would meet the requirements of the 1,000 tube order referred to. (R., p. 365.) But that record was dated during the month before these tubes were shipped and is no proof that these tubes were made on that recipe.

As explained by Kratz, defendant's Exhibit S shows three compounds in parallel columns, each containing a recipe for a tube stock. The right hand column marked 63 Mod., otherwise known in the factory as T-8, was said to have been the one actually used. Even if it were established that this formula was actually used, it would not settle what accelerator was used with the formula. If the Court will turn to the Exhibit, it will see that there is a blank space opposite "Mannose R"—a code name for some accelerator in use at Falls the identity of which Kratz refused to divulge. In the margin this notation appears

"?
Lago P—2.0
M or Diphig—0.2"

Kratz explained this as indicating how much DPG it would be necessary for him to use if he accelerated the compound T-8 with DPG. Kratz testified that "Lago P" and Diphig were factory code names for "thio" and DPG and petitioner says he testified that "M." was MPG, but this last respondent has been unable to verify. Giving petitioner the benefit of every doubt on this notation it leaves it an open question whether "M. or Diphig" was used. Kratz himself so admitted (R., p. 392):

> "Q. Exactly. Now what connects this order with the substitution you stated this morning in No. 63? A. That question isn't clear.
>
> "Q. You said this morning that you substituted diphenylguanidine in formula 63 for mannose R. I now ask what connects that substitution, if and when you made it, with this Rubber City Clearing House order of September 4th, 1917? A. Well, as explained this morning, I knew the relative activity of mannose R, lagos P, and diphenlyguanidine. To me any of those three substances was interchangeable in the quantity shown, but I wanted to try the diphenylguanidine in practice. That was the reason that substitution was made.
>
> "Q. And that is the substitution that you told no one about, isn't it? A. Yes, sir. I had no one to tell.
>
> "Q. What enables you to say that you used the .2 parts of diphig instead of M. or monophenylguanidine? A. Well, I have never been able to have any great quantity of monophenylguanidine. In fact, it is, as I remember it, more difficult to prepare, and get pure.
>
> "Q. Is there anything in this entry referring to lagos P. and M. or diphig, which shows which of these three materials was actually substituted? A. No, I wouldn't think so.
>
> "Q. That is, you can't tell from this entry on the sheet which was actually substituted? A. No. These are my personal notations there—you couldn't."

Kratz testified that he had sufficient DPG to accelerate the first two batches for these tubes and that thereafter he was obliged to use other factory accelerators to complete the

order; that at his direction the compound man who prepared the batch put in less magnesia than the formula called for and that thereafter Kratz himself poured DPG into the mixture in the form of a white powder, not telling anyone else in the establishment what he was doing (R., pp. 366, 372). At page 372 of the record he was asked:

> "What I am getting at is this, who if anybody knew you had put DPG into that batch? A. Not a soul, not a soul knew it. They simply knew that I was putting some white substance in there."

There was no such testimony as the above by Kratz or anyone else in the *National Aniline* case.

Kratz further testified that the DPG batches thereafter went through the usual factory process but were differently tagged (with red tags) which followed the compound until the finished tubes were reached when samples were brought back to him for inspection (R., pp. 400, 401).

Judge Hough in the *National Aniline* case found that Kratz made the tubes with DPG and sold them. Under cross examination in the instant case Kratz's making and selling the tubes has dwindled to the act of sifting into a rubber "mix" a white powder whose identity was known only to him. It can hardly be supposed that Judge Hough would have made the same finding on the Kratz testimony in the instant case.

The respondent introduced two witnesses, Shaw and Hoffman, who were employees at the Falls plant at the time of the alleged manufacture of these 300 tubes. Shaw was the compound man who weighed the ingredients and prepared the mixture which went into the milling machine where it was mixed sufficiently to prepare it for the curing process. He was given a copy of each recipe by Kratz and was in the habit of keeping copies of familiar compounds. He produced a copy of T-8 as he had used it in the Falls factory, as plaintiff's Exhibit No. 13 (R., p. 772.) *It contains no mention of*

*DPG.* He never saw Kratz put anything into a batch on the mill (R., p. 583.) He further testified that he had never seen any red tags used in the Falls factory (R., p. 585.)

Hoffman was a milling man who operated three mills on the first floor in the Falls plant in 1917 and it was at one of these three mills that Kratz claims to have used the DPG. He testified that he had never seen Kratz put powders in the compounds which were being mixed, nor had he ever seen any red tags on rubber stocks going through the mill room (R., p. 599).

Neither Shaw nor Hoffman testified in the *National Aniline* case; nor was any testimony offered to rebut Kratz on this point in that trial.

In an effort to show the successful character of this acceleration test, Kratz testified that DPG was used thereafter in the Falls factory as soon as it could be obtained on a commercial scale (R., p. 406.) When asked when that use commenced, he replied that he couldn't say.

Petitioner explains the non-use again by Kratz' inability to make DPG. Respondent has already shown the emptiness of this explanation. *Supra*, page 58.

This whole defense manifestly rests on nothing but the oral testimony of Dr. Kratz. Apart from any consideration of his credibility it is enough to say that it falls short of what has been repeatedly held essential in proving prior use to defeat a patent. The shipping documents do not corroborate the testimony, and the laboratory memoranda are completely equivocal and ambiguous. *Furthermore, the laboratory record is not connected in any way with the actual making of the tubes.* He himself admitted that no one else in the plant knew what he was doing, thus conceding the secret nature of the work. The incident is an isolated, unexplained, and unexplainable departure from factory routine. It was followed up by no further practical applications, though had Kratz desired to use DPG further, he could have done so; for his Norwalk recipe for its preparation (R., p. 954) shows that he knew how to make it.

The whole proceeding smacks of improbability. It is so out of the ordinary and admitted factory routine, so devoid of purpose, so wholly inexplicable. It fails not only for want of corroboration but also for inherent incredibility.

As stated by this Court in *Deering* v. *Winona Harvester Works*, 155 U. S. 286, 300, 301:

> "Taking this evidence together, it falls far short of establishing an anticipation with that certainty which the law requires. As we have had occasion before to observe, oral testimony, unsupported by patents or exhibits, tending to show prior use of a device regularly patented is, in the nature of the case, open to grave suspicion.
>
> • • • • • • • • • •
>
> "This case is an apt illustration of the wisdom of the rule requiring such anticipations to be proven by evidence so cogent as to leave no reasonable doubt in the mind of the court, that the transaction occurred substantially as stated."

The same rule was stated in *Pyrene Manufacturing Co.* v. *Boyce*, 292 Fed. 480, 485:

> "It is well settled that evidence of prior use must be clear and satisfactory and in its consideration every reasonable doubt should be resolved against the one raising the question. Eibel Process Co. v. Minnesota & Ontario Paper Co., 261 U. S. 45, 43 Sup. Ct. 322, 67 L. Ed.—; Barbed Wire Patent Case, 143 U. S. 275, 284, 12 Sup. Ct., 450, 36 L. Ed. 161; Coffin v. Ogden, 85 U. S. (18 Wall.) 120, 124, 21 L. Ed. 821."

Secret uses are infected with incredibility. Still more so if isolated. In *Richards* v. *Burkholder*, C. D. 1907, 563, 565, 29 App. D. C. 485, was said:

> "If there be concealment or suppression of the invention, the field lies open to be occupied by a more diligent, though later inventor, who, when he has not only put the invention into public use but has also obtained a

> patent for it, cannot be divested of his right to hold the field except upon proof beyond a reasonable doubt that the earlier and more negligent inventor has not gone back to an abandoned device or a device suppressed or concealed in order to establish a prior right."

The remarks of this Court in *Washburn & Moen Mfg. Co.* v. *Beat 'Em All Barbed Wire Co.*, 143 U. S. 275, are very pertinent:

> "We have now to deal with certain unpatented devices, claimed to be complete anticipations of this patent, the existence and use of which are proven only by oral testimony. In view of the unsatisfactory character of such testimony, arising from the forgetfulness of witnesses, their liability to mistakes, their proneness to recollect things as the party calling them would have them recollect them, aside from the temptation to actual perjury, courts have not only imposed upon defendants the burden of proving such devices, but have required that the proof shall be clear, satisfactory, and beyond a reasonable doubt. Witnesses whose memories are prodded by the eagerness of interested parties to elicit testimony favorable to themselves are not usually to be depended upon for accurate information. The very fact, which courts as well as the public have not failed to recognize, that almost every important patent, from the cotton gin of Whitney to the one under consideration, has been attacked by the testimony of witnesses who imagined they had made similar discoveries long before the patentee had claimed to have invented his device, has tended to throw a certain amount of discredit upon all that class of evidence, and to demand that it be subjected to the closest scrutiny. Indeed, the frequency with which testimony is tortured, or fabricated outright, to build up the defense of a prior use of the thing patented, goes far to justify the popular impression that the inventor may be treated as the lawful prey of the infringer."

The policy behind the rule requiring indubitable proof of public use is obvious. Patent laws exist to promote inven-

tive research by rewarding it. If an inventor were liable to be deprived of the fruits of his work by the lone testimony of a rival as to that rival's secret doings, the whole purpose of the patent law would be frustrated. Yet such is the nature of this defense urged by petitioner.

## (c) THE SUBSEQUENT EXPERIMENTAL WORK AT THE FALLS COMPANY.

An effort was made to give the alleged prior work of Kratz an appearance of continuity by introducing his testimony that in 1918, at the Falls Company, he carried on further experiments in the use of DPG as an accelerator, and that it was the result of these experiments that he reported in his paper read at Philadelphia on September 6, 1919. The only testimony along this line is at page 374 of the Record, where, in referring to certain tables in his paper, he said that the work reported thereby had practically all been done at the Falls Company and that it extended over a considerable period of time in 1918.

No records of any sort were introduced to corroborate this testimony; nor did his co-workers, Flower and Coolidge, corroborate him. Indeed, there is no evidence whatsoever, beyond the statement of Kratz, that these experiments were ever carried on.

The absence of documentary corroboration is noteworthy, for petitioner is very insistent that Kratz is a chemist who keeps exact records of all his experimental work. Indeed, this seems to be Kratz' own position (R., p. 342).

The most significant fact, however, about this testimony is the fact that the table, asserted to embody the results of these experiments, contains internal evidence that the experiments never were carried on in 1918 as stated.

The tests were made, it is asserted, with a standard testing formula containing only raw rubber, sulphur and an accelerator, and were made to check the Norwalk tests of 1916 which had been made with a standard testing formula con-

taining, in addition to the constituents above mentioned, zinc oxide. The results of the Falls' tests are said to be embodied in Table 1 of the paper Kratz read at Philadelphia in 1919 (R., pp. 374-375; Pet. br., p. 73). At page 73 of his brief, petitioner is pleased to make a comparison of the results stated in the paper with the results shown to have been obtained at Norwalk in 1916, forming one of the exhibits in this case (R., pp. 952 *et seq.*). That table is reproduced below:

| | Activities Given in Table in Paper | Figures in Paper Multiplied by 3.5 | Norwalk Tests |
|---|---|---|---|
| Aniline | 1.00 | 3.5 | 3.5 |
| Urea | 0.250 | 0.875 | 0.33 |
| Thiourea | 0.300 | 1.050 | 1.0 |
| Monophenylthiourea | 0.450 | 1.575 | 1.5 |
| Diphenylthiourea | 0.850 | 2.975 | 3.0 |
| Monophenylguanidine | 0.075 | 0.262 | 0.25 |
| Diphenylguanidine | 0.075 | 0.262 | 0.25 |
| Triphenylguanidine | 0.500 | 1.750 | 1.75 |

The results, it will be observed, are almost identical with the exception of urea.

This is true of the tests with diphenylthiourea. Yet in the paper published by Kratz February 25, 1921 (R., p. 792), he says:

> "It has for some time been generally recognized that although aniline is effective as an accelerator in the absence of zinc oxide, *diphenylthiourea functions but mildly in the absence of, and strongly in the presence of this substance.* * * *
>
> "Our former experiments, however, were confined to the determination of sulphur co-efficients at one cure only. In the present instance, we desired to compare the relative effects of aniline and diphenylthiourea over a series of cures, and to effect this comparison both by means of the sulphur co-efficients and the physical properties of the various mixtures and cures. Further, it

was desired to compare mixtures which contained zinc oxide as well as the rubber sulphur mixtures previously employed. * * *

"Summarizing these results briefly, we found that, *in a rubber-sulphur mixture, the accelerating effect of aniline is considerably greater than that of diphenylthiourea,* when judged either by sulphur coefficients or on the basis of the physical properties of the vulcanized mixtures. *In mixtures which contained zinc oxide, however, the reverse was found to be true, and diphenylthiourea was more active than aniline when judged by either of the above criteria.* * * *" (Italics ours.)

Manifestly, if, as Kratz himself says, there is such a difference in the behavior of diphenylthiourea as an accelerator in the presence of and in the absence of zinc oxide—and this *is* a fact—then Kratz surely would have noticed this difference if he actually made the test at Falls in 1918 as he testified, and surely he would have recorded this very great difference in the statement of his results in the paper read before the American Chemical Society in September, 1919. But on the petitioner's own showing, the results stated in the Philadelphia paper, supposed to have been obtained without zinc oxide, are practically identical with the results gotten in Norwalk in 1916, with zinc oxide as a part of the formula. The conclusion, therefore, cannot be escaped that no tests were ever made at Falls in 1918 with diphenylthiourea, as testified. If Kratz falsified as to the making of the diphenylthiourea tests what reason is there to believe him as to the other substances in his table, including DPG? The conclusion seems justified that at least part of the table in the Philadelphia paper was based on recollections of the work at Norwalk and not on new work at Falls. There is nothing to show that the DPG work was not among the recollected part.

None of the courts below in either this or the *National Aniline* case, have relied on these Falls' tests of 1918. Only the District Judge in the present case even found that they

had occurred. It is obvious that they do not satisfy the requirements of a prior use and no inference of continued activity with DPG can fairly be bottomed upon them since the evidence clearly does not justify the finding of their having been made.

One further point, but a point of great importance. The testimony at page 374 of the Record is that they occurred in 1918. There is nothing to fix their date prior to March of that year—which, as has already been shown, is the date of Weiss' conception of his invention.

As to the substance of these tests, it was the same as the paper of September 6, 1919, in Table I of which they were embodied. It will be shown *infra*, in Point III that this paper was no such disclosure as would invalidate the Weiss patent. By the same token, the tests themselves would not have been either, even if they had occurred.

### (d) THE ALLEGED BALDWIN ANTICIPATION.

The petitioner contends that Weiss got his idea of using DPG as an accelerator from the work of the witness, Baldwin, his predecessor at the Republic factory. Only one entry in the X-Book, X-2005, first column, marked "(X-2004?)" was adduced in support of this contention, and that was marked "N. G." Truly inspiring!

There is really not a shadow of doubt that that single entry is, in part, a fabrication. This was the opinion of Judge Manton in the *National Aniline* case (Appendix, p. 110), and if this Court, while reading what follows, will turn to the photostat of that entry to be found at page 73[illegible] of the present record, the respondent is confident that he can show this Court that Judge Manton was correct. It may be added that neither the Second Circuit in the *National Aniline* case nor the district judge in the present case relied on the alleged Baldwin test in reaching their decisions.

Baldwin testified that the entry was his and that from the *record* he could *say* that he had conducted the experiment

(R., p. 314). *He did not testify that he remembered making it*, and the entry apparently recalled to his mind none of the details of the experiment. He was unable to say in what respect the experiment was "N. G.", or whence had come the DPG used in it. He was, however, ready enough to speculate on both questions (R., pp. 317-328). Petitioner says that DPG could have been and probably was obtained from the house of Eimer & Amend and cites in support Amend's testimony (R., pp. 291-2). The answer of Amend to question 16 on page 292 is a flat statement that Amend had no idea from whom he had received requests for DPG. There is nothing in his testimony corroborative of the Baldwin experiment or even its possibilty.

The witness Woodward testified that in May, 1922, he made a very careful examination of the X-Book and that he was especially seeking any entries having any connection with the use of DPG (R., p. 639). He distinctly recalled examining page X-2005 because he had occasion to compare the test referred to in column 8 of that page with 2006-G on the next page (R., p. 640). There was no entry of diphenylguanidine on the page at that time.

Thereafter, in June, 1922, he saw the X-Book again after having heard that it had been in New York, and discovered that page 2005 was missing. The next time he saw the X-Book was in December, 1922, in the New York office of the Republic Rubber Company, at which time page 2005 was back in place. On examination of the page, as to which his suspicions were naturally aroused, he saw the word "diphenylguanidine" printed as it now appears on the photostat (R., pp. 641-2).

Testimony similar to Woodward's was given by Carlton (R., pp. 628 and 622); Nellen (R., p. 637); Weiss (R., p. 592); and Vaill (R., p. 577)—all to the effect that in careful searches through the X-Book on various occasions there had been no entry of "diphenylguanidine" on the page in question prior to the controversy over this patent.

Petitioner says (Pet. br. p. 95): "Baldwin is corroborated * * * by the witnesses, Brill and Clark." The actual testimony was as follows: Petitioner's counsel at page 305 asked Brill: "Do you recall any work of Baldwin in connection with DPG?" Brill answered: "I do not." Nothing more: petitioner's counsel veered away from the subject of Baldwin and DPG.

The same is true with respect to the claimed corroboration by Clark as the following excerpt from his testimony shows (R., p. 442):

> *"Q. Are you able to state now, from your recollection, the names of definite substances that were tried in the course of that work? A. I cannot.*
>
> *"Q. You have no recollection of the specific test made with DPG? A. No, sir."*

*He did say the testing of DPG would have been consistent with the search for new accelerators that he recalled was going forward at Republic at the time of the alleged Baldwin experiment. That is the extent of his "corroboration."*

*Apart from the foregoing considerations, there is the further suspicious fact that the total of the parts employed in this experiment appears to have been 101, whereas it is usual to have the parts total 100. It should be further noted that the total is expressed "101.00"—a rather curious fact when it is noted that none of the parts totalled carry the superfluous ciphers or contain any decimals. The ease with which "100" could have been changed to "101.00" is apparent. It is true that there are others of Baldwin's entries, the totals of which are 101; but of these but one is without the superfluous zeros, while, on the other hand, but one of his entries with a total of 100 has the superfluous zeros. The entry, "diphenylguanidine" has a "squeezed-in" look about it. The "diphenyl" part of it is much smaller than the "guanidine" part and the "i" and the "i" of the "guanidine" it should be noticed, definitely "dodge" the "D" of the "D. Phoidly" which appears in Wales' handwriting in the line below. Clearly, the "D. Phoidly" was there first.*

Finally, Weiss testified that the first column looked to him as if it had originally been a test of a standard comparison formula without accelerator. The entry at the top refers to "X-2004C". Turning to X-2004C (that is, column C of page X-2004) to be found at page 730 of the Record, we find a Baldwin entry corresponding to Weiss' supposition—a formula without accelerator. (Zinc, that is, zinc oxide, is a filler, not an accelerator.) The entry on X-2004C apparently was abandoned as no results are recorded at the bottom of the column. The abandonment of X-2004C for X-2005 is perhaps to be accounted for by the fact that part of the printed form is missing from X-2004—that is, the words "8 sheets"—of which 50 parts were to be taken.

Finally, that Weiss' interpretation of this exhibit is the only tenable one is shown by the entry under "cure," near the bottom of the column. Turning back to the exhibit, this is seen to be "120/40," that is, 2 hours (120 minutes) at 40 pounds pressure. A cure of 2 hours at that pressure would be utterly ridiculous for a formula containing any accelerator at all as the other entries show.

There can, therefore, be no doubt that Judge Manton, who saw the witness Baldwin, was right in refusing to accept the evidence of this alleged experiment. But at best, it was "N. G." and not repeated—that is, abandoned and unsuccessful.

### (e) THE PAPERS OF KING AND TWISS.

The papers of King and Twiss, two published articles on the general subject of rubber vulcanization, were introduced by the petitioner. One by King, in "Metallurgical and Commercial Engineering" for September, 1916, gives a list of organic accelerators known at that time. One sentence in that section reads, "Urea and such derivatives as guanidine are advised" (R., pp. 920, 922). This is the only reference in this article within miles of the patent in suit and

this reference is neither to DPG nor to any other di-substituted guanidine.

The other article referred to was by Twiss and contains one reference to aminoguanidine as follows:

> "I have also found that the unstable base aminoguanidine forms an excellent accelerator when applied in the form of its more stable bi-carbonate salt, whilst ammonium bi-carbonate is also very effective" (R., pp. 924, 928).

Aminoguanidine denotes the mono-substituted not the di-substituted compound. Neither of these papers was relied upon by the district court below, and they require no further discussion at this point. Neither of them mentions DPG or TPG. In view of the fact that there are thousands of compounds in the guanidine family, reference to that family was certainly not an anticipation of the idea of Weiss.

If the Court feels any doubt as to the irrelevancy of the above papers, the discussion under Point IV (a) and (b), *infra*, is referred to as demonstrating it more in detail.

## POINT III.

### The Kratz paper did not disclose the invention of the patent in suit.

#### (a) THE PAPER WAS IRRELEVANT AS SUBSEQUENT TO THE DATE OF WEISS' INVENTION.

Both the District Judge in the present case and Judge Hough in the *National Aniline* case treated the so-called Kratz paper as a complete disclosure of the subject-matter of the Weiss patent. Both courts, it is submitted, approached the case erroneously in first considering the Kratz paper, concluding that it told the whole story, and then examining the work of Weiss prior thereto. Such an approach puts the

paper into undue prominence. The first question is what did Weiss invent, and when? If the date of the invention was prior to September 6, 1919, the paper need not be considered at all. If it was after September 6, then, but only then, the paper becomes important.

The respondent has already shown that Weiss is entitled to date his invention as early as March, 1918, for its conception, and February-March, 1919, for its reduction to practice. Under either date, the Kratz paper is irrelevant as subsequent to the date of Weiss' invention; but even if the Kratz paper ante-dated Weiss' invention, it contained, as the following discussion will show, no such disclosure as will defeat the patent.

(b) THE COURT BELOW WAS CORRECT IN HOLDING THAT IT WAS UNNECESSARY TO CONSIDER THE TECHNICAL CONTENTS OF THE KRATZ PAPER IN VIEW OF THE CONSENSUS OF THE EXPERT TESTIMONY IN THIS CASE THAT IT DISCLOSED NOTHING AS TO THE PRACTICAL UTILITY OF DPG AS A VULCANIZATION ACCELERATOR.

The paper is Defendant's Exhibit E (R., p. 825). It is entitled "The Action of Certain Organic Accelerators in the Vulcanization of Rubber," and was published in April, 1920. Weiss' application was filed in November, 1921. As a printed publication, then, it is no statutory bar because within two years of the application. Judge Hough very properly so held in the *National Aniline* case and the petitioner in the present case so concedes in his brief at page 4 thereof.

The paper was orally delivered some day between September 2nd and 6th at the annual meeting of the rubber section of the American Chemical Society, and certain tables, including the so-called table No. 1 (discussed in connection with certain alleged tests by Kratz at Falls in 1918, pp. 66 *et seq.*, *supra*) were set forth on a blackboard. Among

those present at the lecture were Daniels (Weiss' superior), Williams of the Roessler & Hasslacher Company, Sanderson of the Fisk Rubber Company, Morse of the Atlantic Dye Stuff Company, Shepard of Firestone, and representative rubber chemists from the leaders in the industry. Kinsman of the Du Pont Company received a printed copy of the paper from Kratz in June, 1920 (R., p. 1010).

Before taking up the contents of the paper, it will be instructive to see what Kratz, at the time of reading the paper, thought that he was disclosing therein. It is true, as the petitioner contends, that the effect of the Kratz paper upon the Weiss patent, as a disclosure, cannot be controlled by Kratz's intent in publishing it; but Kratz's opinion, as the opinion of a trained chemist upon the import of the matters discussed in his paper is certainly pertinent for the consideration of this court in arriving at its own opinion as to what that paper disclosed. Keeping in mind, then, the essential claims of the patent—*the efficiency of DPG as an accelerator in the practical production of improved rubber products*—and keeping in mind, further, that Kratz was addressing his rivals in a highly competitive business, let us see what he intended to do and what he thought he was doing when he read the paper.

Almost at the outset of the lecture he said:

> "The activities of the substances from a practical standpoint were considered of secondary importance" (R., p. 826).

And as to the scope of the paper he said that the work recorded was in two groups—"Our subsequent and more extensive experiments" and "these preliminary tests". The subsequent experiments had nothing to do with DPG. The "preliminary tests were conducted solely to obtain information for guidance in subsequent experiments and as no sulphur estimations were made, *we do not feel warranted in drawing extensive conclusions from them.*" (Italics ours.) (R., p. 838.)

Kratz, at the date of the trial, held the same opinion as to the nature and scope of the matters discussed in his paper. He testified as follows:

> "A. We absolutely had no intention of giving any information which any other company or competitor could transpose directly for practical purposes. Our idea, however, did give enough information so that any reputable chemist would be guided by the information in the paper.
>
> "Q. Guided to the extent of being put on inquiry, to find out for himself anything you did not say—is that right? A. Guided to the extent of stimulating investigation along the same lines with which we were pioneering".
>
> "Q. And without telling him what to investigate? A. No, sir. We gave him two tables of what to investigate.
>
> "Q. But I mean, you did not tell him any specific substance to investigate? A. Well, we gave him two tables of substances, which we pointed out were excellent accelerators.
>
> "Q. And he could take his choice from any one of the substances mentioned in the two tables? A. Absolutely.
>
> "Q. And go on investigating for himself? A. Yes, sir, because there is no one accelerator of universal application or universal quality" (R., p. 409).

Petitioner criticizes the Circuit Court of Appeals severely for quoting and relying on this estimate which Kratz put upon his own work and for not placing its own estimate thereon. (Pet. br., p. 82.) But as has been already observed Kratz was an expert witness and it is submitted that the Court below rightly relied upon his opinion.

Petitioner contends that that part of the Kratz testimony already quoted has been falsified by tearing it from its context. The testimony in question was preceded by the following (R., p. 409):

> "Q. Were your experiments, as reported in your paper, made to show the relative utility of the substances tested, or to show the increase or variation in sulphur co-efficient? A. Well, that would be a very

> difficult question to answer. Any paper of this kind that would be published, you could not dwell too much on the utility of the different substances, or your superiors would feel as though you were giving away company secrets."

This shows Kratz knew he was on ground dangerous to the defense. In what followed the already quoted section Kratz merely sought to minimize the admissions made in the parts quoted. Respondent will be glad to have the Court read that section of the testimony *in toto* (R., pp. 409 *et seq.*).

There was no expert testimony contrary to this as petitioner seeks to induce the Court to believe. He says respondent's expert witness Whitby paid a fitting tribute to the Kratz paper. He probably refers to the following section of the testimony (R., p. 674):

> "Q. Does the paper by Mr. Kratz accurately state the relative activities of the substances mentioned? A. No.
>
> "Q. Please give your reasons. A. The figure given by Mr. Kratz for the relative activity of a variety of substances—I am especially referring to the figures in his Table 1—are grossly erroneous. The paper as a whole, considered as a whole, is inconsistent in itself. His results are inconsistent with the previous work he did at Norwalk. And furthermore, in so far as in later articles he reconsidered some of the matters dealt with in that April, 1920, paper, he entirely altered his position, and stated in effect that the previous conclusions were erroneous."

It is true that at a time when he had had only an abstract of the paper which omitted all figures as well as Kratz' theory, Whitby did write Kratz that so far as he could judge from the abstract of the paper, it was interesting and satisfactory; but in that letter *Whitby criticized Kratz for not testing the tensile strength of his cures* (R., p. 678). Petitioner is welcome to whatever tribute there is to the Kratz paper in Whitby's testimony.

Shepard of Firestone is mentioned as commending the Kratz paper and Daniels, one of respondents' witnesses is stated to have referred to it as "interesting", and as conveying definite information. Shepard testified that Firestone had never yet begun the commercial use of DPG and that the Kratz lecture had not stimulated his interest in DPG to anything beyond what it had been before—which apparently was very slight. As to Daniel's commendation, a paper is not an anticipation because it is interesting and informative. The question is *what* information it conveys. The Court will look in vain for any statement from Daniels that the Kratz paper contained information as to the practical utility of DPG.

The report on this meeting *made at the time* by the witness, Williams, (R., p. 776) demonstrates clearly that Kratz's casual mention of DPG made no impression on that witness. This exhibit was not a part of the evidence in the *National Aniline* case.

The fact is that there is not an iota of testimony from any of the chemists who testified to the effect that the paper disclosed the substance of the Weiss patent. Williams of the Roessler & Hasslacher Company, testified that the information disclosed in the paper was insufficient to enable him to repeat even the experiments performed by Kratz and obtain the same results. (The reason for this is explained below in subdivision (c) of this section of the brief).

It is quite true that on the application for the patent, the examiner thought the Kratz paper an anticipation of the patent in suit; but this does not conclude the matter. The examiner was clearly wrong. There was concurrence in the expert testimony of both litigants that the Kratz paper contained no disclosure of anything of practical importance and this testimony was corroborated by the behavior of those who heard the paper; for, of all the rubber chemists who heard the paper only Daniels is shown to have displayed in his subsequent behavior any interest in DPG. Moreover, it should be noted that his interest was *exclusively* in

*DPG* and not in MPG although according to Kratz the two substances were equal in accelerative activity. The conclusion is inescapable that Daniels had prior information as to the practical utility of DPG and Daniels testified that this prior information came from Weiss.

The respondent submits to this Court that the Circuit Court of Appeals was right in its judgment that in this state of the record it was unnecessary to discuss the technical contents of the Kratz paper. Since the petitioner, however, seeks to create the impression that the result would have been very different had the Court below considered the technical contents of the Kratz paper, it is necessary to go into that and that will be done in what follows.

(c) A CONSIDERATION OF THE TECHNICAL CONTENTS OF THE KRATZ PAPER SHOWS THAT IT CONTAINS NO SUCH DISCLOSURES AS CAN INVALIDATE THE PATENT IN SUIT.

[*Note: To a proper understanding of what follows, prior perusal of pp. 1-9 of this brief is essential.*]

The portion of the Kratz paper dealing with DPG purports to be based on the alleged Falls experiment of 1918 (R., pp. 374, 375) which, it will be recalled, the respondent has already discussed *supra* at pages 66, *et seq.* These Falls experiments, it will be recalled, were made with a standard formula containing only raw rubber, sulphur and accelerator, to check up on the results of the Norwalk experiments performed with the same series of accelerators but with a formula containing, besides the accelerator, sulphur and raw rubber, a considerable quantity of zinc oxide.

In both series of experiments the aim was to determine the comparative activity, as accelerators, of the substances tested. The Kratz paper says (R., p. 838):

> "The activities of the various substances were compared in the mixture previously mentioned—92.5 parts

of rubber and 7.5 parts of sulfur—taking as a standard the effect obtained with one part of aniline, vulcanized for 90 min. at 148° C."

In the footnote on the same page of the paper it is stated:

"The comparisons were made at what was adjudged to be in each case the correct cure, as measured by the physical properties of the various mixtures only. Owing to this fact, the values assigned in Tables I and II were not found to be in strict agreement with their respective sulfur coefficients as determined in the subsequent experiments. Such comparisons, based on physical properties alone, are apt to be misleading due to the toughening action imparted to the rubber when certain accelerators are employed; this effect is very noticeable in the case of *p*-phenylenediamine."

In other words the results in Tables I and II were announced in the paper itself as "apt to be misleading." Just what was the inaccuracy the possibility of which was thus admitted. He says, "* * * the value assigned in Tables I and II were not found to be in strict agreement with their respective sulfur coefficients * * *" By "sulfur coefficient," Kratz meant a measure of the amount of sulphur found in the product chemically united with the rubber and therefore a measure—other factors, including time, being kept constant—of the degree to which the "accelerator" used has speeded up this union (R., pp. 403-404, 658-659). This was what Kratz was interested in in the paper, the subject matter of which he states as follows (R., p. 826):

"The present paper records a portion of the results procured in an attempt to obtain further information in regard to the action of certain organic substances *in accelerating the vulcanization reaction* * * * The activities of the substances from a practical standpoint were considered of secondary importance." (Italics ours.)

It is as a measure solely of the extent to which the union of sulphur and rubber is promoted by the substance tested that

Kratz admits that his values in Tables I and II are "apt to be misleading."

The values were likely to be inaccurate and misleading because of "the toughening action imparted to the rubber when certain accelerators are used"—that is, certain "accelerators" have the capacity to improve the product over and above the improvement resulting from the mere speeding up of the chemical union between the sulphur and rubber. This is to say, as respondent has set forth at pages 1-9 of this brief, that the physical properties of the product—and therefore the utility of the "accelerator"—are not necessarily related to this capacity of "accelerators" to promote this union (R., pp. 658-659). Kratz insisted on this toughening effect over and over again, especially on cross-examination, apparently unconscious of its importance to the respondent's case (R., pp. 398, 403, 414).

Beyond the statement in the footnote already quoted in reference to the toughening action of *p*-phenylenediamine and the results of the later experiments in the determination of the sulphur coefficients, there is, in the paper no clue as to which of the thirteen substances in Tables I and II have this "toughening" effect on the rubber. (Table II has nothing to do with DPG). If Kratz determined the sulphur coefficient of DPG, it does not appear in the paper. *There is, then, absolutely nothing in this paper that discloses, either directly or inferentially, that DPG is one of the substances that have this toughening effect on the rubber;* but at page 413 of the record will be found Kratz's testimony at the trial of the present case to the effect that DPG does have this capacity to improve the rubber product over and above the improvement resulting from the mere speeding up of the union between the sulphur and rubber. See also R., pp. 398-399, 403-404, and 414. In this statement Kratz was corroborated by Whitby (R., pp. 37-41) and Williams (R., 659).

The value given for DPG in Table I of the paper was, then, clearly inaccurate and misleading as a measure of the degree,

to which DPG speeds up the chemical reaction between the sulphur and rubber. Was it an accurate and practical measure of what Kratz called "the activities of the substances from a practical standpoint"? It was *not,* as respondent will now show.

Table I is reproduced below:

"Table I—Relative Activities—Thiourea Series.

*Parts Required to Equal One Part Aniline*

| | |
|---|---|
| Aniline | 1.000 |
| Urea | 0.250 |
| Thiourea | 0.300 |
| Monophenylthiourea | 0.450 |
| Diphenylthiourea | 0.850 |
| Monophenylguanidine (a) | 0.075 |
| Diphenylguanidine (Sym) | 0.075 |
| Triphenylguanidine | 0.500" |

The table looks very accurate and scientific with its values carried out to three decimal places, but its author himself shows that this seeming accuracy is delusive. Just how delusive it is he divulged at the trial of the present case.

If the court will turn to page 374 of the Record it will find the following testimony by Kratz:

> "Q. State what work you did in testing these accelerators covered by Tables I and II, without zinc oxide and when and where you did it? A. This work here without zinc oxide as represented by the Tables shown in Exhibit "E" were practically all done at the Falls Rubber Company and covered a considerable period of time. You will note that *there are no physical tests under these experiments* and that *the results were all carried on,* as I previously outlined, *by vulcanizing slabs and using the thumb and tooth test,* simply to check up that there were no unusual discrepancies between the use of zinc in the formula and without zinc in the formula." (Italics ours.)

And if Table I be regarded, contrary to Kratz's testimony, as based on the Norwalk rather than the Falls experiments,

its status is not improved; for Kratz in his answer to XQ301 at page 404 of the record stated that in his Norwalk tests the same crude "thumb-and-tooth" method of determining the cures was used.

It is obvious that the accuracy of Kratz's table of values depends directly upon the accuracy with which the sameness of the degree of vulcanization effected is determined. That was his standard of comparison (R., p. 838). It is elementary science and ordinary common sense that the sameness of the degree of vulcanization effected with the various accelerators could not be accurately determined by Dr. Kratz by merely biting and pulling and pinching the cured slabs of rubber. Moreover, Kratz stated in the paper (R., p. 830) that the conditions of his experiment did not permit of a differentiation between MPG and DPG. Just why, he does not explain but his testimony at pages 407 and 408 of the Record indicates that perhaps the answer is that he was uncertain which substance he was dealing with. If this is true, it reflects still further upon the value given to DPG in Table I. But, however that may be, it is plain that this very accurate and learned-looking table of Dr. Kratz's is so infected with error and inaccuracy as to be utterly worthless as science and utterly misleading for practical purposes.

This is, of course, the reason why Williams of Roessler and Hasslacher, though he tried three times to duplicate the Kratz work, was unable to obtain anything like the same set of values (R., pp. 654, 655).

Defendant's counsel did not cross examine on this destructive testimony.

Williams made a comparative table (Plaintiff's Exhibit 20) which demonstrated how unworkable in practice, the Kratz table really was (R., p. 779). Weiss' patent, it will be recalled, suggests as an illustrative compound 50 parts rubber, 45.5 zinc oxide, 3.5 sulphur, 1 DPG. This is 2% on the rubber, in the language of the practical rubber man. Now it takes thirteen times as much aniline as DPG to do the same work, ac-

cording to Kratz. Therefore, as shown in the third column of Plaintiff's Exhibit 20, it would take 26% aniline on the rubber to cure the compound illustrated in the patent. This would result in a compound "which of course every rubber compounder knows is impossible. You cannot add it. The stock would run all over the floor. It is very soft. It also shows (Exh. 20) that you would have to use 22.1 parts of thiocarbanilid, 11.95 anhydroformaldehydeaniline. These quantities of course we know are absurd for use as accelerators in vulcanization. * * * You couldn't get a cured stock containing 26 parts of aniline. If you would vulcanize that I don't think you could get it out of the mold; it would be in a flowing condition" (R., p. 672).

*No testimony of this character attacking the Kratz paper on its merits was submitted in the National Aniline case. Nothing was introduced in the case at bar to refute this testimony.*

There is no evidence in the *record* that the formula specified by Kratz in Table I would *or could* produce a single commercial article. There is not a single iota of testimony to the effect that any practical rubber work ever was based on the Kratz table of values except Kratz's highly improbable story of the manufacture of the three hundred inner tubes at Falls. As respondent has already shown, this story of Kratz' is not only improbable, but completely uncorroborated.

On the other hand, the practical utility of the formula given in the patent in suit was fully demonstrated. Williams testified (R., p. 670) that the formula specified in the patent would *produce a very good quality of tennis balls, toys, rubber gloves, rubber heels, tennis soles, soft gaskets, white aprons, tire rubber stocks, etc., and this testimony was not refuted or challenged.*

Thus far we have considered only the possibility that the Kratz paper might be an anticipation of Weiss' disclosure that DPG shortens the time required for curing rubber prod-

*acts. It only remains to show how absurd it would be to hold it an anticipation of Weiss' disclosure in his patent as to the capacity of DPG to improve the rubber product.* Aside from its presence in Table I, the only reference to DPG contained in the Kratz paper is, a short comment of a sentence or two (R., p. 830) upon the fact that MPG and DPG were found to be more active than TPG. This fact shows how little the paper was concerned with DPG and how slight was Kratz's interest in it.

In the paper there was not one word as to how good or how bad the DPG rubber product was. The sum of the Kratz disclosure as to DPG was that a certain proportion of that substance, used in a rubber formula, would produce a cured slab *which, when pinched and pulled and bitten, felt the same to him as slabs cured under similar conditions with different proportions of other accelerators.*

This should be contrasted with Weiss' disclosure in the patent in suit as to the qualities of the DPG rubber product (R., pp. 718-718a):

> "I have found that diphenylguanidine is much more powerful and efficacious as an accelerator in vulcanization than triphenylguanidine. For example, in the vulcanization of hard rubber articles the use of diphenylguanidine not only hastens the vulcanizating action but *results in a final product much superior in texture, durability and aging qualities* over that when the triphenylguanidine is used. *A greatly improved product* also *results* when diphenylguanidine is used as an accelerator in the vulcanization of soft rubber compounds, particularly as regards *elasticity, aging qualities* and *freedom from 'bloom'.*"

And again:

> "It will therefore be appreciated that when using the *accelerator according to my invention the vulcanization is accomplished by using comparatively small quantities of the accelerator, thereby obviating undesirable loading or adulteration of the rubber compound.* Furthermore,

*by the use of such accelerator, the texture and durability of the final product is greatly improved and the tendency commonly present in vulcanized rubber to bloom and become brittle with age is greatly reduced if not entirely obviated. My improved accelerator is particularly useful and valuable where it is desired to produce a harder or less elastic portion in an article leaving other parts which are required to be more elastic and flexible, such as in automobile tires where the beadstock is usually made harder than the body or carcass of the tire proper.* The relative amounts of vulcanizing agent and accelerator may be so proportioned that the various parts of a single article may be cured to different degrees of hardness *without danger of over-curing the softer or more elastic parts."* (Italicization added.)

*The matter needs no comment. It is manifest* that the *Kratz paper contained no disclosure comparable to* the foregoing.

*The petitioner contends that whatever work* of value with DPG was *done by* Weiss was *done subsequent* to the Kratz lecture and inspired by it. If this is so the X-book records would show a marked difference between Weiss' method of working previous to the lecture and his method thereafter. Let us see what is the fact.

Daniels came back to Youngstown with his copy of Table No. I September 7, 1919. Weiss had three dated and one undated DPG tests in the X-book prior to the lecture and eight afterwards. The tables below show the percentage of DPG on the rubber in each dated test. Kratz' percentage on the rubber works out to .08% from the figures given in the paper—that is, .075 parts of DPG on 92.5 parts of rubber.

EXPERIMENTS OF WEISS.

| Pre-Katz | % on the Rubber | Post-Kratz | % on the Rubber | Ratio of Weiss' % on the Rubber to That of Kratz |
|---|---|---|---|---|
| /10/19 (2034E) | 2.0 | 9/29/19 (2010H) | 1.7 | 20 to 1 |
| '21/19 (2006H) | 6.3 | 10/ 3/19 (2064D) | 2.0 | 25 to 1 |
| / 4/19 (2042A) | 3.7 | 10/12/19 (2059D) | 2.0 | 25 to 1 |
| | | 10/12/19 (2059E) | 2.0 | 25 to 1 |
| | | 11/ 9/19 (2059F) | 2.0 | 25 to 1 |
| | | 11/ 9/19 (2059G) | 2.0 | 25 to 1 |
| | | 12/19/19 (2065C) | 0.3 | 4 to 1 |
| | | 12/19/19 (2065D) | 1.1 | 14 to 1 |

If Weiss had been guided by the Kratz results rather than by his own tests, he would have reduced the amount of DPG to some figure near the .08% shown in the Kratz table. But not only did he never come near the .08% of Kratz, but his closest figure to it, .3%, *four times as great*, was not tried until December 19, more than three months after he had the Kratz figures. And in the ilustration in the patent, his percentage is 2, in line, not with the .08 of Kratz, but with his own experiments—pre-Kratz and post-Kratz. His percentage of 2 in the patent is 25 times that of the Kratz table.

It is no wonder Kratz failed to discover in his Norwalk experiments and those alleged to have taken place at the Falls Company that DPG had such great capacity to improve the rubber product. He did not use it in sufficient quantity.

The lecture showed Weiss that Kratz was working on DPG as a possible accelerator and that he knew something about its speed, but not much.

Whitby's testimony on cross examination showed that he did not learn of the advantages of DPG over other accelerators until 1923, after the issuance of the patent in suit. The Kratz paper was familiar to him, as his testimony on pages 67 and 68 shows, but he learned nothing of the advantages of DPG over other accelerators from that (Rec., p. 69).

Authorities need scarcely be cited to show that work such as Kratz's was no anticipation of the patent in suit. If Weiss had done nothing at all up to the Kratz lecture, he would still be entitled to his patent, for he would be well within the language of this Court in *Whitely* v. *Swayne*, 7 Wall. 685, 687:

> "Clearly if any other person had chosen to take up the subject of the improvements, where it was left off by Steadman, he had a right to enter upon it, and if successful, would be entitled to the merit of them as the original inventor, for *he is the first inventor, and entitled to the patent, who being an original discoverer, has first perfected and adapted the invention to actual use.*" (Italics ours.)

In *Coffin* v. *Ogden*, 18 Wall. 120, 124, this Court said:

> "If the thing were embryonic or inchoate; if it rested in speculation or experiment; if the process pursued for its development had failed to reach the point of consummation, it cannot avail to defeat a patent founded upon a discovery or invention which was completed, while in the other case there was only progress, however near that progress may have approximated to the end in view."

It is submitted that Kratz's attempts were not even near to the acomplishment of Weiss.

The petitioner affects to contend that Weiss, himself, has admitted that Kratz was the true inventor of DPG rubber and the process for producing it. He points to the application for employment made by Weiss subsequent to his departure from Republic. Weiss mentioned his discovery of the process for the cheap manufacture of DPG and referred to the Kratz paper in corroboration of the importance of his accomplishment. The attempt is to construe this into an admission that Kratz was the true inventor of the patent in suit. In considering this contention the court should bear in mind that early in 1920 when these applications for em-

ployment were made by Weiss, he was under the impression that a patent could not be obtained for DPG rubber and the process for making it. In other words, he had been led to believe that his important accomplishment was the perfection of the method of the cheap manufacture of DPG. It was only natural that he should refer to a paper read before the American Chemical Society as substantiating, however vaguely, his representation that he had made a discovery of real value. The respondent invites the court to consider these events carefully, for such consideration will show that they cannot possibly be construed as admissions of the import contended for by petitioner.

Petitioner also relies on the fact that when, upon Weiss' application for the patent in suit, the Patent Examiner referred to the Kratz paper as an anticipation, Weiss availed himself of his privileges under Rule 75 of the Patent Office, permitting an applicant to establish by affidavit a date for his invention earlier than that of a cited anticipation. The contention is that this was an admission that the Kratz paper constituted an anticipation.

The court should not overlook that the Patent Office practically invited Weiss to take advantage of Rule 75 rather than contest the finding of anticipation. (R., p. 895.) In view of this method of proceeding in the Patent Office, how can it possibly be contended that Weiss admitted that the Examiner was right in his finding that the Kratz paper constituted an anticipation of his patent? Weiss simply availed himself of one of two alternative modes of proceeding.

At the time this application was pending, Weiss and his assignee, the respondent here, were encountering competition from large and powerful chemical companies. (R., pp. 1011 and 1018.) It was therefore necessary to have the patent issued as quickly as possible to protect the business then being threatened. Had Weiss elected to contest the sufficiency of the Kratz paper, a prolonged controversy with the Patent Office might have developed with destructive consequences to

the then infant business. In view of his invention prior to the lecture as established by the evidence in the present record, he was clearly within his rights, and he clearly acted honorably as well, in acting on the invitation of the Patent Examiner to establish the fact of his prior invention by means of affidavits in accordance with Rule 75 of the Patent Office.

The respondent is wholly at a loss to understand how Weiss availing himself of the privileges that the law accorded to him can possibly be held against him. He took the shortest way to the patent that the law provided. That is all. The practice under Rule 75 is well established in the Patent Office and has received the sanction of the courts. *Thacher* v. *Mayor*, 219 Fed. 909, 910; *Deering* v. *Winona Harvester Works*, 155 U. S. 286, 298.

These cases not only approve the practice under Rule 75 but hold that in a subsequent suit on a patent issued pursuant to an affidavit presented under the rule, the party attacking the patent must disprove the truth of the facts shown by the affidavit. Not an iota of proof of this character has been tendered in this case.

This fact is a sufficient comment on the contention of the petitioner that the patent was obtained by a misrepresentation of the facts. The effort is to make the present appear to be an unusual case. It must be clear to the court that this is not so.

Summing up, then, the consideration of the Kratz paper, it is shown not only by the expert testimony in the case and not only by an analysis of the actual technical contents of the paper, but also by the implications of the behavior of the parties involved that that paper neither was, nor was understood to be, an anticipation of the patent in suit.

## POINT IV.

### The Weiss patent disclosed patentable invention.

*[Note: To a proper understanding of what follows, prior perusal of pages 1-9 of this brief is essential.]*

The defendant contends that the disclosure of the patent does not show invention. The trial court did not pass upon this question; but the Circuit Court of Appeals held expressly that the patent disclosed invention, approving Judge Manton's judgment of the same tenor in the *National Aniline* case. The Circuit Court of Appeals in the latter case assumed patentable invention and, of course the Patent Office thought there was invention disclosed or it would never have issued the patent in suit.

The claims of the patent herein chiefly relied upon are Nos. 5, 8, 9 and 12. Nos. 5 and 8 claim the process of treating rubber or similar materials by combining with the rubber a vulcanizing agent and, in No. 5, a di-substituted guanidine; and, in No. 8, diphenylguanidine. Nos. 9 and 12 cover a vulcanized compound consisting of rubber or similar material combined with a vulcanizing agent, and, in No. 9, a di-substituted guanidine; and, in No. 12, diphenylguanidine. Claims 5 and 9 are therefore somewhat broader than claims 8 and 12, in that the latter refers specifically to DPG, which, however, is a di-substituted guanidine.

#### (a) THE BROAD CLAIMS.

In his brief (pp. 108 to 113) petitioner contends that there are special considerations which apply to the broad claims of the Weiss patent. While these contentions of the petitioner are not all strictly pertinent to the question of invention, it seems best to dispose of them at this point.

The petitioner's argument is that the Weiss claims to di-substituted guanidines as accelerators were anticipated by a reference by a French writer, Du Bosc, to "diaminoguani-

dine" as one of "other interesting guanidine derivatives which are capable of acting as vulcanizers (accelerators". (R., pp. 934 to 939.)

Now, this substance is so unstable that it cannot exist as such. It is one of those unstable organic bases that, in theory, ought to exist because salts of it exist, but which always slips through the chemist's fingers, when he tries to isolate it, changing into something else. Petitioner's own expert admitted that diaminoguanidine could not exist alone so that a cure of rubber could be made with it (R., pp. 510 to 511) as indeed petitioner does also at page 109 of his brief.

But the petitioner goes on:

> "When dealing with such substances, chemists know perfectly well what to do. They mix them with something else which does not affect their serviceability but does maintain them stable. In the case of an unstable amino-guanidine, they mix with it the necessary ingredients *to form the bicarbonate of salt of the aminoguanidine.*" (Italics ours).

A high school boy knows that the salt of a substance is a substance different from the substance itself. Diaminoguanidine bicarbonate is no more diaminoguanidine than calcium carbonate (lime or marble) is calcium (which is a metal); nor than sodium bicarbonate (baking soda) is sodium (which is another metal). Respondent is at a loss to account for this section of petitioner's brief. It seems incredible that petitioner is ignorant of this elementary fact of chemistry.

The same is true of the alleged anticipation by Twiss. Twiss in the very section of his paper which petitioner quotes, says that it is a bicarbonate salt of which he is speaking. Twiss, moreover, spoke only of aminoguanidine which is not a di-substituted guanidine at all.

*The broad claims of the Weiss patent speak of di-substituted guanidines and not of the salts thereof.*

Further contentions are made that the broad claims are broader than Weiss' invention and that there are some di-substituted guanidines that are not accelerators. Weiss' work,

by petitioner's own admission, extends to ditolylguanidine and there can be no doubt that Weiss as the pioneer worker in the rubber art with the di-substituted guanidines, diphenylguanidine and ditolylguanidine, not to speak of the other di-substituted guanidines with which he has worked, is entitled to a wide range of equivalents. Many of these di-substituted guanidines are chemically so similar to DPG and the other di-substituted guanidines with which Weiss had worked when he made disclosure in the patent of his discovery that "the di-substituted guanidines, particularly diphenylguanidine, are particularly effective as accelerators", that unless the Weiss claims were construed to include them, those claims would be commercially worthless. The broad claims are at least thus broad.

But the short answer to this whole section of petitioner's brief is that the limits of the broad claims are not an issue in this suit. The only issue here involved as to these broad claims is whether they are *broad enough* to cover DPG. That they are is obvious since it is not disputed that DPG is a di-substituted guanidine. The attempt of the petitioner to induce this court to pre-judge possible future cases should, then, clearly fail. The claim of infringement should be sustained under the broad claims as well as under those that refer to DPG specifically.

### (b) THE SPECIFIC DPG CLAIMS.

#### *The Petitioner's Argument.*

The petitioner's general contention of want of invention is based on the proposition that the guanidine family, so-called, was known before Weiss to have accelerative qualities and that TPG especially was known as a vulcanization accelerator. Upon the assertion that DPG is a near relative of TPG in the guanidine family, it is argued that the conception of the efficacy of DPG as a practical vulcanization accelerator did not involve that "leap of the imagination" which is said

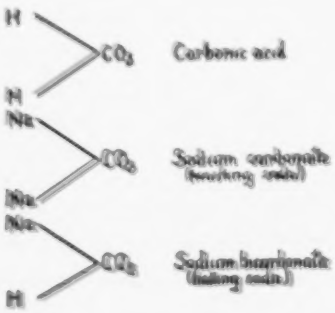
to characterize invention. The petitioner points to the fact that a reference to DPG appeared on the same page in Richter's Chemistry as did a reference to TPG, and likens the inspiration that led to the experiments with DPG to the selection by a plumber from his bag of a tool slightly different from that which he has been in the habit of using.

*The Petitioner's Fundamental Error.*

It is submitted that whatever plausibility the petitioner's contention may seem to possess rests on the similarity of the names, "diphenylguanidine" and "triphenylguanidine." They *seem* so much alike to ear and eye. But similarity of the chemical names of substances, as any chemist knows, connotes no similarity between the substances denoted beyond similarity in molecular structure.

If the Court will at this point turn back to pages 8 and 9 of this brief where the structure of guanidine and its phenylated derivatives, DPG and TPG, are diagrammed, it will see what the molecular relationship is between these substances.

Just as DPG and TPG are built up from the guanidine molecule by the substitution of phenyl for hydrogen in that molecule, so washing soda (sodium carbonate) and baking soda (sodium bicarbonate) are built up from the carbonic acid molecule by the substitution of sodium for hydrogen therein, thus:



The parallel is obvious, yet any housewife knows that the uses of washing soda and baking soda are totally different. If told they were chemically almost identical she would think it a strange identity indeed.

Just how little chemical similarity, or even identity means in terms of practical utility is further apparent when it is remembered that coal, graphite, and diamond are, to the chemist, all carbon. If it be thought that in some abstruse way the usefulness of a substance can necessarily be predicted from a knowledge of its molecular structure, there is the expert testimony to the contrary (R., pp. 674 to 675, 781). The testimony of the behavior of the experts is even more eloquent. Though the superiority of DPG as a commercially useful accelerator is now conceded and though it is conceded that the utility of TPG was old before Weiss, Weiss is the only man who made any real effort to find out the utility of DPG or to make it commercially available.

*The presumption of validity arising from the issue of a patent is unusually strong in the present case.*

It is well settled that the issue of a patent raises a sufficient presumption of invention to sustain it if none of the recognized rules of exclusion, to be hereinafter discussed, defeat invention. It should be noted that this presumption in the present case should be unusually strong; for in his application for the patent in suit Weiss frankly stated that TPG had been known and used before his work on DPG and the di-substituted guanidines. Yet the Patent Office issued the patent without a doubt as to the existence of patentable invention in the Weiss disclosure.

The force to be given this presumption of validity has been well expressed by Judge Witmer of the Middle District of Pennsylvania in *Ward Baking Company* v. *Hazleton Baking Company*, 292 Fed. 202, 204:

> "The grant of the patents carries with them the presumption of their validity. The prima facies of validity

is so strong that the burden of proof upon a defendant to establish defenses that attack the validity of a patent is the same as that upon the prosecution in a criminal case. Courts are not permitted, therefore, to constitute themselves into a board of reviewing examiners and on nicely balanced consideration find that the patent office examiners were in error. The grant of the patent carries with it the respect due a contract made on behalf of the government by those expert and authorized to act for it in honesty and good faith, and unless proof is forthcoming carrying conviction beyond reasonable doubt to the contrary, its validity will not be impeached."

*If either element of the Weiss disclosure shows patentable invention, the patent in suit must be sustained.*

The patent in suit disclosed two discoveries, first, the ability of DPG to speed up the vulcanization process and, second, the ability of DPG to improve the resulting product. There is not one of the alleged anticipations in the present case that discloses anything as to the second of Weiss' discoveries, as the analysis in the foregoing sections of this brief demonstrates. What little was known about DPG before Weiss related to its mere speed as an accelerator. That little—work of Kratz—was, as has been shown, vague and inaccurate. The Court will look in vain through the work of Kratz or any of the other alleged anticipations for any disclosure as to the capacity of DPG to improve the rubber compounds made with it. Weiss was the first and only person to discover this ability of DPG to improve the product. Therefore, even if the prior state of the art were conceded *arguendo* to be such as to preclude invention in the discovery of the mere speed of DPG, the second discovery would still be enough to sustain the patent.

*The Weiss invention required more than mere "mechanical" skill and was more than a substitution of materials.*

Patentability under our statutes involves three requisites: novelty, utility, and invention. *Novelty* must be conceded in

this case. Neither DPG nor any other di-substituted guanidine accelerator was ever used prior to the events in this record. *Utility* has been amply demonstrated. *Invention* is a question of fact, in resolving which there are no positive legal rules. As stated by Mr. Justice Brown in *McClain* v. *Ortmayer*, 141 U. S. 419, 427:

> "The truth is the word (invention) cannot be defined in such manner as to afford any substantial aid in determining whether a particular device involves an exercise of the inventive faculty or not."

As a result, certain negative rules of exclusion have grown up. Without endeavoring to enumerate all of them it has been said that mere mechanical skill is not invention, mere workmanship is not, mere omission of parts is not, mere substitution of materials is not, mere change of form, proportion, or degree not, mere substitution of equivalents is not, nor is mere rearrangement. These are the only exclusions having any possible bearing on the present case. Invention cannot be denied to the patent in suit under any of them.

Presumably the defendant relies especially upon the rules relating to mechanical skill, and substitution. It would not be helpful to endeavor by citation of authority to show that the discovery of DPG was more than an exercise of mechanical skill. Each discovery of this character rests on its own peculiar facts. Judicial decisions in other cases are not of assistance. But it is palpably absurd to argue that the long series of experiments recorded by each alleged inventor in this case with a material that had to be extracted by an unfamiliar laboratory process was nothing more than the mere selection by a plumber from well-known tools in his bag.

The mechanical-skill rule of exclusion is most frequently applied to deny invention to a discovery of which it can be said that any skilled artisan would have constructed it if he had been faced with a real need for the article. In the present case it is sufficient answer to any argument based on the

rule thus explained to point to the fact that rubber chemists the country over were engaged in a bitter competition to discover exactly the thing disclosed in this patent. Obviously, the work of Weiss was not work which any skilled artisan could have been expected to have done in case of need, for the need was general and all the artisans were at work. The fact that others were seeking the subject-matter of the patent without finding it is strong evidence of invention. *Carnegie Steel Co.* v. *Cambria Iron Co.*, 185 U. S. 403, 446; *Brill* v. *North Jersey Street Railway*, 124 Fed. 778, 779; Walker on Patents, 5th Ed. 726. The witness Brill, for the petitioner, testified that he went through Richter many times and that the book was a much used text in the Republic laboratory. But it never occurred to him to use DPG, although he was searching for accelerators (R., p. 304).

Nor can invention be denied under the rule of exclusion relating to substitution of materials. For it is well settled that wherever substitution of materials results in an *improved* machine or product or in a *great commercial economy*, the substitution does involve invention. *Hicks* v. *Kelsey*, 18 Wallace 670; *George Frost Co.* v. *Samstag*, 180 Fed. 739.

*The demonstrated utility of the Weiss patent, which the petitioner is estopped to deny, requires that any doubt on question of invention be resolved in favor of the patentee.*

It is obvious that the petitioner's whole argument fails to take any account of the essential quality in any discovery which the patent law strives to protect, to-wit, the utility thereof to the public. No matter how simple the discovery may seem to be, if something new and of value has been given to the world, the structure will be held to involve invention. The proposition is well stated by Judge Manton in his opinion in the *National Aniline* case:

> "I am satisfied that the use of diphenylguanidine as in the plaintiff's process, involved invention. Using it advanced the art of rubber making. Its utility and the

consequences which followed, fully support the real practical test of the sufficiency of an invention. Where the utility is proved to exist in any degree, a sufficiency of invention to support the patent must be presumed. (*Smith* vs. *Goodyear*, 93 U. S. 486). This substitution involved a new process of manufacture to develop a new use of the properties of diphenylguanidine and there was a new and useful result obtained. (See *Smith* vs. *Goodyear*, supra; *Rumford Chemical Works* vs. *N. Y. Baking Powder Co.*, 134 Fed. 385; *Genl. El. Co.* vs. *Hoskins Mfg. Co.*, 224 Fed. 464.)"

Nor is it open to this defendant to dispute the existence of patentable utility in the Weiss patent. It is well settled that where a defendant has adopted the advantages of the patent in place of what it had formerly used under the prior art, that defendant cannot dispute the patentable utility of that which its use admits involves patentable utiliy.

"Whether it (advantageous result of improvements) exists in sufficient degree to be of great practical utility is in dispute, but the defendants have adopted this construction and obtained whatever advantage in it there may be, and they cannot dispute its patentable utility."

*Cummer & Son* v. *Atlas Dryer Co.*, 193 Fed. 993, 997 (6th C. C. A.).

To the same effect is *Brammer* v. *Schroeder*, 106 Fed. 918, 926 (8th C. C. A.).

The figures as to the commercial use of DPG are conclusive as to the utility of the invention. In 1924, according to the United States census figures put in evidence, 1,018,609 pounds of DPG were sold as against 340,829 pounds of TPG. (R., p. 643.) When it is recalled that one part of DPG is equal to eight parts of TPG, and that there is little difference in cost between one part of each, the tremendous saving to the rubber industry effected by Weiss' discovery can be appreciated. Add to this DPG's effect in improving the quality of the product and the importance of Weiss' contribution to the art is seen.

The following excerpts from a letter, written by the witness, Williams, of the Roessler & Hasslacher Company, to Mr. Colby Dill of the same company before the present litigation commenced but after the respondent had put DPG on the market, shows the opinion of a then competitor as to the utility and efficacy of DPG.

> "We are attaching complete reports on tests made recently on various accelerators. I wish to draw particular attention to the results shown for diphenylguanidine * * *
>
> "When operating at 307 degrees F., corresponding to a pressure of 60 lbs., we find that we are able to produce a tensile strength of 3446 lbs. in 5 minutes, whereas the maximum under the same condition for Hexa is only 2687 lbs. which is produced in 30 minutes. Also for these two stocks we find that the elongation for diphenylguanidine is 730 as against 520 for hexa, which shows that the diphenylguanidine has produced a better stock physically than the Hexa produced. At 50 lbs. and 40 lbs. the length of time necessary for maximum cures when using diphenylguanidines are about ¼ as long as it is necessary to cure to the maximum when using Hexa. At the same time the diphenylguanidine stocks in every case show a very much superior maximum tensile strength.
>
> "These results would show that if a tire manufacturer used diphenylguanidine as his accelerator, he would be able to produce a very superior article by using a low per cent. of diphenylguanidine and curing for a fairly long period at a low temperature. In this manner he would be able to thoroughly heat his tire thru, which would facilitate the proper vulcanization of the underlayers, that is, skim coat, friction and breaker. The formulas for the underlying stocks could readily be adjusted by putting a slightly larger quantity of diphenylguanidine in them so that they would reach their optimum cure at the same time that the outer coat or tread reached its optimum cure. *We cannot help but consider that this accelerator is the best accelerator for tire stocks that we have yet come across.*" (R., pp. 664-666.) (Italics ours.)

Nor does the fact that DPG was a substance known to chemists long before the work of Weiss militate against the patentability of his discoveries. Improvement of the character above noted has always been regarded as invention, as the following language from *Loom Co.* v. *Higgins*, 105 U. S. 580, 591 makes clear:

> "It may be laid down as a general rule, though perhaps not an invariable one, that if a new combination and arrangement of known elements produce a new and beneficial result, never attained before, it is evidence of invention."

In *Westmoreland Specialty Co.* v. *Hogan*, 167 Fed. 327, it was held that the discovery of a new quality or use in a familiar device constitutes invention. In that case a celluloid dredge for the top of saltcellars was held to constitute patentable invention, although a like dredge had been used on the top of talcum powder cans. The patent was sustained because when used on saltcellars the celluloid dredge prevented the absorption of moisture by the salt, a desirable result. Talcum powder does not cake or become damp and consequently the problem of preventing the absorption of moisture was not present when talcum powder was involved. The discovery of the special quality of that celluloid dredge when used on saltcellars constituted something new. So here the discovery of DPG's usefulness in speeding the process of the vulcanization of rubber and in improving the rubber product is the sort of advance in the useful arts for which patents are granted.

The rule in regard to utility is this, that if any doubt of invention exists, that doubt is to be resolved in favor of the patentee if the utility of the patent is shown. Thus, in *Smith* v. *Goodyear*, 93 U. S. 486, this Court said at page 495:

> "Webster, on the subject-matter of patents, page 30, says: 'The utility of the change, as ascertained by its consequences, is the real practical test of the sufficiency of an invention; and since the one cannot exist without the

other, the existence of the one may be presumed on proof of the existence of the other. Where the utility is proved to exist in any degree, a sufficiency of invention to support the patent must be presumed.' We do not say the single fact that a device has gone into general use, and has displaced other devices which had previously been employed for analogous uses, establishes in all cases that the later device involves a patentable invention. It may, however, always be considered; and, when the other facts in the case leave the question in doubt, it is sufficient to turn the scale."

Especially applicable to the present case is the following language of the opinion at page 496:

"But where there is some such new and useful result, where a machine has acquired new functions and useful properties, it may be patentable as an invention, though the only change made in the machine has been supplanting one of its materials by another. This is true of all combinations, whether they be of materials or processes. In *Crane* v. *Price*, 1 Webst., Pat. Cas. 393, where the whole invention consisted in the substitution of anthracite for bituminous coal in combination with a hot-air blast for smelting iron ore, a patent for it was sustained. The doctrine asserted was, that if the result of the substitution was a new, a better, or a cheaper article, the introduction of the substituted material into an old process was patentable as an invention. This case has been doubted, but it has not been overruled; and the doubts have arisen from the uncertainty whether any new result was obtained by the use of anthracite."

If the substitution of anthracite for bituminous coal in a process for smelting iron ore was sustained as an invention because the introduction of the substituted material resulted in a new, better or cheaper article, clearly the introduction of DPG in lieu of other accelerators in the vulcanization process, with its resultant better rubber and cheaper process, was patentable as an invention. As Dr. Whitby, expert witness, testified, no other accelerator known at the time "ap-

proached diphenylguanidine in regard to the collection of advantages which it displayed" (R., p. 39). Petitioner admits this in his brief at page 116. See also R., pp. 662-666.

The Second Circuit Court of Appeals has stated the same proposition in the following language in *H. D. Smith & Co.* v. *Peck, etc., Co.*, 262 Fed. 415, 417:

> "Whether the structure involves invention is a question of fact, and the determining factor is not whether the achievement is difficult or easy, but whether it has, in point of fact, given the world something of real value, that it did not have—a benefit conferred upon mankind. *O'Rourke Engineering Const. Co.* v. *McMullen, et al.*, 160 Fed. 933, 88 C. C. A. 115."

See also *Individual Drinking Cup Company* v. *U. S. Drinking Cup Company*, 220 Fed. 331, 334.

There is no reason to doubt the patentability of the Weiss invention under any of the recognized criteria, but if patentable invention did stand in doubt it is clear that the demonstrated utility of the Weiss patent should determine this issue in favor of the respondent.

(c) *The finding of patentable invention by the Court below was not, as petitioner contends, the result of the court's having confused Weiss' several patents.*

Respondent has had occasion several times to refer to Weiss' separate patent covering the process for cheap commercial manufacture of DPG. The petitioner contends that the court below reached its decision only because it confused that patent with the patent in suit. In particular at page 121 of his brief he quotes as an instance of this confusion the following passage from the opinion of the Circuit Court of Appeals (R., p. 1031):

> "* * * no one prior to Weiss seems to have conceived and worked out any practical plan by which DPG's potential powers could be commercially used. The reason

> for this is plain for no one knew, or, for that matter, had tried to learn, how DPG could be produced in such quantity as to make possible its commercial use."

Many other excerpts from the opinion follow, most of which are so torn from their context as not to give a fair idea of the reasoning of the Circuit Court of Appeals. The respondent will be satisfied to have the Court read the opinion as a whole and come to its own conclusion as to whether the court below actually did confuse the two patents.

Moreover, the existence of this other patent for a process of manufacturing DPG is not irrelevant to the present case. It is very relevant. Kratz did nothing. Weiss, not by accident, but by long and persistent endeavor worked out a process for the commercial manufacture of DPG. When he came to New York in 1920 Weiss was able to convince Doty and Woodward that there would be a *commercial demand* for DPG and that it would be worth their while to back, with their time and money, his process for its cheap manufacture. It is impossible to believe that these young men would invest their money and the last eight years of their time in an enterprise for the manufacture of this substance unless they had good reason to believe that it would displace the accelerators already in use. Years before 1920 faster accelerators were known than DPG. The conclusion is therefore inescapable that Weiss disclosed to Doty and Woodward not only the speed of DPG, but also the peculiar capacity that DPG displays of improving the useful qualities of the rubber product made with it.

## CONCLUSION.

**The judgment of the Circuit Court of Appeals is sound and should be affirmed.**

Respectfully submitted,

JOHN W. DAVIS,
JAMES J. KENNEDY,
Counsel for Respondent.

# APPENDIX.

## JUDGE MANTON'S OPINION.

UNITED STATES DISTRICT COURT,

FOR THE SOUTHERN DISTRICT OF NEW YORK.

DOVAN CHEMICAL COMPANY,
Plaintiff,

against

NATIONAL ANILINE & CHEMICAL CO., INC.,
Defendant.

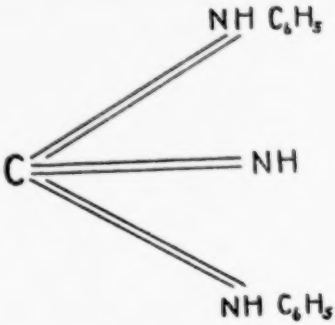
DRURY W. COOPER, Esq.,
EDWARD W. VAILL, Esq.,
*of Counsel for Plaintiff.*

DEAN S. EDMONDS, Esq.,
FRANK E. BARROWS, Esq.,
*Of Counsel for Defendant.*

---

The patent in suit, No. 1,411,231, was applied for November 12, 1921, and granted March 28, 1922, and is for vulcanization accelerators. It is a process for improving rubber compounds so that the finished product shall be of superior quality and so that the time required for vulcanization shall be greatly reduced over that ordinarily required for such purposes. In the art, when certain organic substances are added to rubber mix during the compounding, a catalytic or similar action is produced which causes the rubber or gum to

unite or react more rapidly or thoroughly with sulphur or other vulcanizing agents. The inventor discloses that diphenylguanidine is particularly effective for this purpose. The formula indicated is given as




Recognizing that di-substituted guanidine produced by laboratory methods had been known to chemists for years to be used in accelerators of this type, [sic] it was thought that di-substituted guanidine was not known to be efficacious or useful as accelerators in vulcanizing, nor could it be produced in sufficiently large quantities in a substantially pure form or at a sufficiently low price to be available for this purpose, and the inventor says that the use of diphenylguanidine had been unknown prior to his researches and that he found it much more powerful and effective as an accelerator in vulcanization than triphenylguanidine. The diphenylguanidine not only hastens the vulcanization but results in a final product much superior in texture, durability and aging qualities over that when triphenylguanidine is used. A greatly improved product results, particularly as regards elasticity, aging qualities and a freedom from bloom. The method of carrying out the invention is illustrated as follows: the rubber may be compounded in proportions of 50 parts by weight of new rubber, 45.5 parts by weight of zinc oxide, 3.5 parts by weight of sulphur, 1 part by weight of diphenylguanidine.

They are mixed together in a suitable way, such as by milling and then vulcanized or cured in molds under heat corresponding to steam pressure of about forty pounds per square inch. This vulcanizing temperature is continued until the compound is suitably vulcanized, which requires from ten to twenty minutes, depending upon the shape and size of the article being vulcanized. This accelerator is useful and valuable where it is desired to produce a harder or less elastic portion in an article leaving other parts which are required to be more elastic and flexible, such as automobile tires. Indeed, this accelerator has been so successful that a large demand has been built up and a market created for it, and several of the large chemical corporations are manufacturing it. The purchasing public shows a willingness to pay for it. This is a practical illustration of its substantial value. Again, the defendant is using the process, and it too has built up a large and profitable business.

It is urged by the defendant that three others, prior to Weiss, tested diphenylguanidine as an accelerator. One George D. Kratz read a paper in September, 1919, at a meeting of the Chemical Society of Philadelphia in which diphenylguanidine was referred to as an accelerator. He, called as a witness, testified that he incorporated some twenty to thirty grams of diphenylguanidine in some tire tube stock which was sold to the Rubber City Clearing House at Akron, Ohio, in 1917. In his paper, Kratz said, speaking of his work: "We have chosen to employ only substances which have previously been cited by others and whose definite chemical composition permits comparisons with homologs or other closely related compounds." And he says that "the activities of the substances from a practical standpoint were considered of secondary importance." A mere reading of the paper before this Society is not a statutory publication under Sec. 4886 of the Revised Statutes. There was a publication in the Chemical and Metallurgical Engineering on October 1, 1919. What was printed there does not disclose the in-

vention or give it into the possession of the public fully, so that it might be practically and publicly employed. There was a complete publication by Kratz and others in the Journal of Industrial & Engineering Chemistry for April, 1920, and the application for the patent in suit was filed November 12, 1921. This publication was less than two years prior to the filing of the first Weiss application, which was on July 2, 1921. That paper refers to the diphenylguanidine as being an accelerator, but it was Weiss who was the first one to adequately test, by actual experience and to overcome the practical difficulties there were in the way of the accomplishment. Weiss was employed by the Republic Rubber Company of Youngstown, Ohio, in the Fall of 1917, and was under the supervision of the chief chemist Daniels. Up to March 8, 1918, Weiss was associated with one Carlton, who went with the Republic Company in June, 1917, about four months prior to Weiss' engagement. Carlton says that he had frequent conversations with Weiss with regard to accelerators, and that he pointed out to him many organic compounds suggesting that they be tried. It was impossible to try them except those which were easily obtainable on the market or very easily prepared, and Weiss referred him to "Richter's Organic Chemistry" and suggested after reading from that, that diphenylguanidine might be an accelerator. It was after this that Weiss went to Pittsburgh to the Carnegie Library to obtain further information on the subject of guanidines from the literature there available. He made this investigation the first week of January, 1919, under Mr. Daniels' direction. Daniels then became interested in developing diphenylguanidine as an accelerator and said that in the Fall of 1918 "I knew he had some results that looked pretty good." After returning from Pittsburg, some tests on rubber compound were made, the result of which was shown under date of February 10, 1919, and after that another test was made on the shoddy compound under date of March 21, 1919. Another test was made March 4, 1919, and still there

was another under date of September 29, 1919, and again October 12, 1919, in which diphenylguanidine prepared by the new process Mr. Weiss introduced. In the Fall of 1919, Weiss supplied Mr. Daniels with diphenylguanidine for his personal use. The X-book record of the Republic Company shows various tests made by Weiss. It demonstrates extensive work by him experimenting to ascertain the value of diphenylguanidine as an accelerator in various compounds adapted for practical use. The first test slabs were shown to Mr. Daniels at the time of Weiss' Pittsburgh visit. These slabs were made in December, 1918. The Weiss tests recorded in the Spring of 1918, were before the reading of the Kratz paper, and demonstrate that Weiss had been working on the production of diphenylguanidine in commercial quantities. He left the Republic Company on March 15, 1920. Thereafter, he visited rubber companies and at their places talked on this subject and exhibited slabs of rubber that had been cured with the use of diphenylguanidine. He then returned to New York, being unsuccessful in obtaining a position with the various rubber companies, visited the offices of the defendant and made application for employment, but did not succeed. He later visited the States Metals Company (afterwards the selling agent for the plaintiff herein) and interested officers of the plaintiff company. In May, 1920, after the organization of the plaintiff company, a plant was built in Brooklyn, New York, where diphenylguanidine was manufactured for commercial use.

The X-book referred to proved to have page 2005 torn out. This was subsequently found. This records in the first column a test of the use of diphenylguanidine and is said to have been made by Baldwin. The rest of the entries were made by Weiss. That column was under date of February 23, 1917, whereas all the other entries (none record the use of diphenylguanidine) were made in the year 1918. I am not satisfied that there was such an entry of an experiment as is indicated in column 1 at the time Weiss entered his record

regarding the use of diphenylguanidine. It is not shown where Baldwin obtained diphenylguanidine to experiment with. Baldwin's testimony as to this experiment is unsatisfactory and I decline to accept it.

Kratz is said to have disclosed his idea to others in 1916. It is said that then he experimented and reached definite conclusions as to diphenylguanidine while working for the Norwalk Rubber Company and that what he did at the Norwalk Rubber Company constituted a reduction to practice as also the occasion of making the tubes for the Falls Rubber Company in 1917. He says, speaking of his work at Norwalk under date of November 1, 1916 (report from Norwalk plant, Exhibit E), that it gives the relative accelerating values of certain substances tested. But what he did appears to have been a laboratory experiment which was abandoned because nothing further was then done until the later effort at reduction when employed by the Falls Rubber Company where the tubes were manufactured as above referred to. There thirty grams of diphenylguanidine were mixed with rubber stock made into inner tubes for automobiles and such tubes were sold as blemished rubber in Akron, Ohio. No further commercial use was made. The amount of acceleration used could have had no substantial effect in curing the rubber as compared with that used in plaintiff's process. The burden of proof is upon the defendant to establish the defense of prior public use. When the application was in the patent office, the Kratz paper was referred to, as were his experiments, and a hearing was had there. I think the issuance of the letters patent carried with it the presumption of validity and, in view of the defense offered here, should be established beyond every reasonable doubt. (Coffin vs. Ogden, 18 Wall. 120.)

> "The prophetical suggestions in English patents of what can be done, when no one has ever tested by actual and hard experience and under the stress of competition the truth of these suggestions, or the practical difficulties in the way of their accomplishment, or even whether the

suggestions are feasible, do not carry conviction of the truth of these frequent and vague statements." (Westinghouse Air-Brake Co. vs. Great Northern Ry. Co., 88 Fed. at 263.)

Mere vague and general representations will not support such a defense as the knowledge supposed to be derived from the publication must be sufficient to enable those skilled in the art or science to understand the nature and operation of the invention and to carry it into practical use. Whatever may be the particular circumstances in which the publication takes place his account published, to be and in effect support such defense, must be an account of a complete and operative invention capable of being put into practical operation. (Seymour vs. Osborne, 11 Wall. 516.)

I am satisfied that the use of diphenylguanidine as in the plaintiff's process, involved invention. Using it advanced the art of rubber making. Its utility and the consequences which followed, fully support the real practical test of the sufficiency of an invention. Where the utility is proved to exist in any degree, a sufficiency of invention to support the patent must be presumed. (Smith vs. Goodyear, 93 U. S. 486.) This substitution involved a new process of manufacture to develop a new use of the properties of diphenylguanidine and there was a new and useful result obtained. (See Smith vs. Goodyear, *supra;* Rumford Chemical Works vs. N. Y. Baking Powder Co., 134 Fed. 385; Genl. El. Co. vs. Hoskins Mfg. Co., 224 Fed. 464.) A complete and successful invention should not be voided by proof of a number of incomplete and imperfect experiments made by others at an earlier date. Even though the experimenters may have had the idea of the invention and may have made partially successful efforts to embody it in a practical form, there is not sufficient to defeat an issued patent. This applies in cases arising under patents for chemical products. (Amer. Wood Paper Co. vs. Fibre Disintegrating Co., 23 Wall. 566.) An invention to be patentable should be com-

plete and capable of producing the result and one who has been successful in his effort should not be deprived of the consequences of that success merely because someone came near it theretofore. (Diamond Patent Co. vs. Carr Co., 217 Fed. 400.)

I think Weiss is the discoverer of the process which has borne such good results that the plaintiff as assignee should be accorded the benefits thereof.

Decree for plaintiff.

Dated: January 24, 1923.

MANTON,
United States Judge.

UNITED STATES DISTRICT COURT,

SOUTHERN DISTRICT OF NEW YORK.

DOVAN CHEMICAL COMPANY,
Plaintiff,

against

NATIONAL ANILINE & CHEMICAL CO., INC.,
Defendant.

On this application for reargument, I have examined the detailed information which has been submitted by both sides. Much of which has been argued as to the prior disclosure was before the Patent Office and there examined and held not to defeat plaintiff's claims. After carefully examining what has been submitted by learned counsel for the defendant, my views as to the facts disclosed by the evidence remain unchanged, and this requires my denying the application to set aside my former determination granting a decree for the plaintiff.

Motion denied.

Dated: February 19, 1923.

MANTON,
U. S. Circuit Judge.

# CHRONOLOGY OF THE WORK OF KRATZ AND WEISS

**The Center Columns Are Taken from The Chart Attached to the Petitioner's Brief.**

**The Matter in Red is the Comment of the Respondent.**

| KRATZ. | | WEISS. |
|---|---|---|
| Graduated from Cornell University and entered employment of Diamond Rubber Company (R., pp. 337, 338), afterwards combined with Goodrich Rubber Company. | 1912 | |
| | 1913 | Graduated from the Free Cooper Union (R., p. 86). |
| Left Goodrich to enter employment of Norwalk Rubber Company (R., p. 338). | 1914 | |
| Tests were undertaken to determine the comparative amounts of various substances (of which DPG happened to be one) required to produce same cure in same time, at same temperature as arbitrary amount of sulphocarbanilide used in particular laboratory formula (R., pp. 350, 952). Sameness of cure was determined by thumb-and-tooth (R., p. 404). Kratz' superior, Russell, saw as result no reason for substituting DPG for accelerators then in use in Norwalk plant (R., p. 1023).<br><br>Not proved and highly improbable. | Kratz's Norwalk Tests.<br>About 100 tests of eight different accelerators in rubber compounds, including 9 to 12 tests with DPG, resulting in a table of relative accelerating values (Vol. II, p. 838). Kratz fully corroborated by Russell and by written records. | 1916 Graduated from Polytechnic of Brooklyn (R., p. 86). |
| Secret and never followed up by Kratz or Falls Company (R., pp. 372, 406). | Kratz's Tubes made at Falls Co. in August and September.<br>About 300 inner tubes made using DPG as accelerator and sold in the regular course of business. | 1917 Started work on rubber with Republic Rubber Company (R., p. 91). |
| No evidence to prove these tests took place and results claimed indicate that they were never performed and that figures in Table I of Kratz paper came from Norwalk 1916 work. Thus, it is impossible that tests at Falls Company in 1918 should have given same results using thiocarbanilide, (diphenylthiourea or sulphocarbanilide) *without* zinc oxide as did Norwalk tests of 1916 using these substances *with* zinc oxide. Yet such are results claimed (R., pp. 374, 792). | Kratz conducted a further series of tests at the Falls Co. with the same eight accelerators previously tested at Norwalk and obtained the table of relative accelerating values which appeared later in the Kratz paper. | 1918 Weiss alleged conception in February or March. No written record made.<br>Three tests claimed to have been made by Weiss using DPG in December, all overcured. These tests were not recorded in X-book; there is no record of them, and Weiss' affidavit says the amount of DPG he succeeded in making was insufficient for a test.<br><br>Corroborated by Carlton (R., p. 92).<br><br>Corroborated by Halliday and Daniels (R., pp. 204, 234). |
| Paper contained tables as determined at Norwalk three years earlier. Paper gave no information as to superior quality of DPG rubber nor any directions as to how to produce it. Values stated in the table were inaccurate (R., pp. 654 to 656, 398 to 399, 838) by Kratz's own admission, and all practical information deliberately omitted (R., p. 409). Paper without interest to any of his hearers except Daniels. Daniels had prior knowledge from Weiss. No recommendation of DPG over other accelerators (R., p. 410). | Kratz's paper read, September 2-6.<br>The paper was of intense interest to the assembled rubber chemists. Portions of it, including the table of relative accelerating values, were copied by many of those present. Daniels said he had never heard a paper on accelerators that was so interesting or so informative and Shepard said it enabled rubber chemists to apply the accelerators sensibly. | 1919 Two or three tests using DPG made by Weiss in February and March. The date of one test has been altered in the X-book. The other two tests are on shoddy mixtures and showed no superiority of DPG over TPG.<br><br>Between March 4 and September 10 no further tests using DPG were recorded in the X-book and Weiss' uncorroborated statement that some were made is inconsistent with his former testimony.<br>Daniels, the Chief Chemist of the Republic Co. and Weiss' superior, said he was not prepared to say how good DPG was, and TPG was the accelerator being actively developed at Republic.<br>Weiss learned of Kratz paper from Daniels. Daniels gave Weiss a copy of the table of relative activities of the Kratz paper and instructed Weiss to work with DPG.<br>All work on TPG at Republic stopped abruptly after the Kratz paper and active work with DPG began.<br><br>Numerous tests made by Weiss using DPG during October, November and December. | As result of these successful tests Weiss stopped his search for new accelerators. Tests showed *marked* superiority over all other accelerators and Weiss disclosed this knowledge to Daniels, Carlton, Seil and Greenwald (R., pp. 748, 731, 753, 613 and 904 to 905).<br>As result of February and March tests, further tests unnecessary. Weiss worked on process of making DPG (R., p. 226). Told Nellen its value (R., p. 230).<br><br>Executive officers at Republic Company not necessarily as convinced of worth of DPG at *this* time as was Weiss.<br><br>Kratz's lecture convinced Daniels Weiss was right (R., p. 216).<br><br>Did not stop until three months after Kratz lecture when testing of Weiss' post-Kratz and pre-Kratz work was complete and it was clear a good DPG process was at last available.<br>In all these tests DPG was used in same proportions as in Weiss' pre-Kratz experiments. This work of Weiss' in no way followed information in Kratz paper.<br><br>Weiss left Republic Company in March |